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NATIONAL ESTUARINE POLLUTION STUDY. PROCEEDINGS OF PUBLIC MEETING HELD AT CHARLESTON, SOUTH CAROLINA ON JUNE 5, 1968

Federal Water Pollution Control Administration
Charlottesville, Virginia

1968

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CLEAN WATER

....FOR THE NATION'S ESTUARIES

PROCEEDINGS OF THE
SOUTH CAROLINA PUBLIC MEETING
CHARLESTON, SOUTH CAROLINA
JUNE 5, 1968

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Exhibit:

Diagram

Roster of Participants

PUBLIC MEETING
NATIONAL ESTUARINE POLLUTION STUDY
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

Francis Marion Hotel Charleston, South Carolina
June 5, 1968

- - -

(The public meeting of the National Estuarine Pollution Study was held on Wednesday, June 5, 1968, beginning at 9:00 a.m., in the Colonial Room of the Francis Marion Hotel,Charleston, South Carolina, Gary Gardner, Chairman, presiding.)

CHAIRMAN GARDNER: May I have your attention, please? It is time for us to get started here this morning. I want you all to take your seats. I think one thing that would help considerably, if those in the back would care to move up front.

I would like to ask you all to stand for a moment for a short invocation.

(Invocation.)

CHAIRMAN GARDNER: My name is Gary Gardner. I am Director of Technical Programs for the Middle Atlantic Regional Office in Charlottesville, Virginia. Most of you that received invitations received invitation from Mr. L. W. Gebhard and Mr. Clair Guess. Mr. Gebhard unfortunately was unable to be with us today and I drew the straw.

I would like to begin by summarizing very briefly the purposes of this meeting, the objective of the estuary study, and a few details on the scope.

The objectives are to prepare a report for the Secretary of the Interior to Congress which will document and analyze the various aspects of estuarine pollution; make recommendations for a comprehensive national program for the preservation, study, use and development of estuarine zones, and recognize the respective roles of Federal, State and local governments, plus public and private interests.

The Act titled The Clean Water Restoration Act of 1966 calls for a comprehensive study of the effects of pollution, including sedimentation in the estuaries and estuarine zones on beneficial use, and a consideration of use trends which will influence future pollution problems. The Act also calls for the assembly, coordination and organization of all existing data, the conduct of surveys to provide supplementary data, in respect to estuaries, the identification of problems and areas in need of further study, analysis of economic and social values of the estuaries, and a discussion of the major economic, social and ecological trends as they may influence future pollution problems.

The Act directs that the study be made in cooperation with other Federal agencies, State agencies, private organizations, institutions, and individuals.

We are here today to obtain expressions from individuals, and to some degree from governmental organizations. I might say that we have been soliciting from Federal and State agencies statements. These for the most part will be sent to us directly and will not be heard to any degree here this morning -- to any large degree. We are primarily soliciting statements from private organizations, institutions and individuals.

It should also be pointed out that the minutes, the official minutes, of this meeting will remain open for fifteen days and those of you who are here and do not care to make a statement at this time and would like to submit a statement to the Regional Office of FWPCA, please do so within this 15-day period and they will be included in the official proceedings of this meeting.

I would like to introduce our distinguished group here to my left and right.

On my left, I have Mr. Clair P. Guess, Jr., who is the Executive Director of the South Carolina Water Resources and Coordinating Committee. Mr. Guess has been appointed by Governor McNair to represent the State of South Carolina in this estuarine endeavor.

On my right, the first individual is Mr. Gene Jensen, who is the chief of our office of Estuarine Studies in Washington, D. C.

Beside Mr. Jensen is Mr. William Linton, who is Executive Director of the South Carolina Pollution Control Authority.

Beside Mr. Linton, Mr. Harry Bell, who is Chairman of the South Carolina Water Resources and Coordinating Committee.

These gentlemen will act somewhat as a panel. Their primary purpose is to solicit possibly in a little more detail comments from our speakers, to clarify on any certain points, and they will have an opportunity during the program, if they desire to do so, to make statements themselves.

We also have with us Mr. John Thoman, who is the Regional Director of Southeast Region of the Federal Water Pollution Control Administration.

Mr. Thoman, would you stand up and be recognized? All the way in the back.

I might point out the Southeast Region has the Savannah River Basin. Our regional boundary goes to Savannah River Basin. He is very much interested in the statements given here this morning.

We have Mr. Al Wastler who is also from the office of Estuarine Studies in Washington.

And I understand we have Mr. Herb Haller from the Delaware River Basin Commission.

Mr. Haller, would you stand and be recognized.

There are a couple of things that I would like to pass on. We have received several statements from individuals who are unable to attend. These will be made a part of the record just as those who make statements here, or submit them within the 15-day period. I would like to request that since there appear to be a good number of individuals who desire to make statements that, if possible, to hold them reasonably short. We have a transcript -- the entire statement can be included as a part of the record.

We will begin and I will ask that each individual come forward to use this mike.

I will ask that Mrs. D. L. Waldron, the League of Women Voters, if she will come forward, please.

MRS. DARYLE WALDRON: I am Mrs. Daryle Waldron. I am Water Resources Chairman for the Charleston League of Women Voters.

We in the League are very much aware of the conflict between those who need to use large quantities of water for carrying off waste and those who are concerned with the effect of this use on our environment. A reconciliation of their diverse aims must be a solution to the problem. The crux of the water pollution abatement is its cost. In one way or another the public is going to pay. The problem is to find an equitable way of distributing this cost. We know that we will pay for municipal waste treatment through taxes and use charges. We will also pay for industrial water treatment either in some form of a tax subsidy or as consumers.

The public is willing to pay for intangibles such as beauty, a healthy environment for fish and other wildlife, and water fit for swimming. We urge our public officials to give first consideration to the ultimate quality of our environment.

Thank you.

CHAIRMAN GARDNER: Mrs. Waldron, do you mind standing here a moment?

I wonder if the panel has any questions that they would like to ask?

MR. GENE JENSEN: I am afraid I do. And I don't know whether you can hear me in the rest of the room without a microphone, but I will try.

This is the seventh one of the State meetings that have been held throughout the nation. I have attended most of them but not all of them. In most of these meetings people have also spoken on the problems of dredging and filling, and on the problems of community planning and community zoning. You made your point quite clear, I think, on water pollution and the relationship of pollution control of the estuaries. Do you have any thoughts on these other two areas? That is my first question.

MRS. WALDRON: Well, dredging and filling, we consider as simply another form of pollution as far as the estuaries are concerned. In terms of long-range planning -- is this what you question us about? I am not quite sure what you are asking me on this. We are concerned with long-range planning, and the League has rather consistently supported community planning of a very high quality, very strict planning.

MR. JENSEN: Thank you.

CHAIRMAN GARDNER: Thank you, Mrs. Waldron.

Next, I would like to call upon William Baldwin, who indicated he would like to make a statement.

MR. WILLIAM P. BALDWIN: My name is William P. Baldwin, and I am a Land Management Consultant for private lands in the South Carolina coastal plain. In my 30 years experience considerable time has been devoted to estuarine marsh research and management, primarily for water power.

With this background, speaking as a South Carolina resident and taxpayer, I shall make a few comments about local water pollution. As citizens, most of us have been relatively powerless to halt the aggregate pollution increase resulting from political and industrial expediency. But there has been an awakening and desire to reverse this trend. Certainly, thinking citizens deplore the filth of Charleston harbor, the declining crab population and related symptoms of chemical and sewage pollution.

May I suggest six specific projects and trends that bear watching by all of us as citizens and taxpayers.

(1) At Bushy Park peninsula just above Charleston the first electric generating plant and the first dye works are being planned. This industrial complex growing in Berkeley County should not be permitted to add a single pound of pollutants to the Cooper River, the Wando and Charleston harbor. It should avoid construction of another pulp mill on the Cooper River, refineries and other pollutant-forming industries.

(2) Plans are well along to redivert the bulk of the Santee River waters from Charleston harbor, via Lake Moultrie, back into the Santee River. This fresh water is needed to revive the Santee delta's formerly rich habitats. At St. Stephen, where the diverted fresh water will enter

the Santee flood plain, a "peaking power plant" is planned. As indicated by U. S. Corps of Engineers (see page 31 in their Survey Report on Cooper River, S. C. - Shoaling in Charleston Harbor, July, 1966) the daily powerhouse releases, instead of a normal average flow of 12,500 cubic feet per second, would vary from zero to 24,500 cubic feet a second. Biologists of the U. S. Fish and Wildlife Service recently indicated that this unnatural flowage rhythm is in direct contrast to the normal tidal cycles in the the Santee delta and they predict undesirable effects in the Santee tidal estuary.

In a sense this is a form of pollution, so far as we can view its ultimate effect on estuarine tidal vegetation and marine life. A peaking power plant should not be constructed at St. Stephen but rather one based on a reduced and sustained normal discharge from Lake Moultrie. In addition, no new industrial plants based on the improper use of this fresh flow should be permitted at St. Stephen or between there and the ocean. The Santee delta waters are now classified in sections from Class A to C and the effort should be to establish an entire Class A delta and estuary.

(3) The lower Edisto, lower Ashepoo, Combahee and Broad Rivers are now Class A streams and so they should remain. However, in this hurly-burly life we lead, there is always somebody who naturally in making a living is going to try to do the best they can to capitalize on this fresh water. Edisto is probably the best source of fresh water of these four rivers, and I note in the Wall Street Journal for October 27, 1967, an advertisement for an 816 acre Industrial Site, 54 miles from Charleston, with "an inexhaustible source of fresh water." These beautiful and rich marshes that these rivers nourish in Charleston, Beaufort and Jasper counties should be kept absolutely free of increased pollution, necessitating careful screening of new industry.

The value of these estuaries for seafood production and recreation will increase annually. The City of Beaufort and environs, centered in this extensive marshland heritage, should avoid the industrial expediency that has affected Charleston and Georgetown harbors.

(4) Associated with Beaufort is the "State Port" of Port Royal, which last year reportedly had one ship use its facilities. Dredging is a form of pollution, and there is no need for the S. C. Ports Authority to pursue, from political necessity, the unnecessary development and maintenance of a dredged harbor and ship channel at Port Royal. Ocean shippers are adequately cared for at Savannah and Charleston, at tremendous expense to the taxpayers. The Ports Authority should liquidate this project and avoid future dredge-silt damage to Port Royal Sound and adjacent waters, marsh and beach.

(5) While on the subject of these particular salt marshes I would point out that a group of coastal landowners has been active in the past three years attempting to legally confirm an individual's right to own tidal marshland. A common non-legal argument against such ownership is that the individual would not respect and preserve the march whereas "the State" would.

But it is of interest that in July, 1965, the S. C. Budget and Control Board nearly granted a 25 year lease to a phosphate dredging company for all of the estimated 350,000 acres of "State-owned" salt marsh in Beaufort and Jasper counties. As a result of protest by legal counsel for the afore-mentioned group of individuals this tremendous marshland acreage was reduced to 25,000 acres in the upper Broad and Coosaw Rivers. Phosphate dredging in marshland is a form of pollution deleterious to marine life, recreation and esthetics. It should not be encouraged by the State nor condoned by its citizens.

I could continue for some time on these various projects but I will end with No. 6. As printed in the October 27, 1967 issue of the Charleston News and Courier, the State Ports Authority is seeking congressional approval for the U. S. Corps of Engineers to study potential diversion of the Pee Dee and Waccamaw River flow from Georgetown harbor and Winyah Bay. This presumably would be done by constructing an enormous canal through the mainland into the Atlantic Ocean elsewhere. The new ocean front silting and pollution that would result from such unwise diversion would affect the estuarine and recreational values of Pawleys Island, Litchfield Beach and the beaches to the north.

If certain officials have not learned anything from the ill-advised Santee-Cooper diversion of many years ago, let us hope that increasing numbers of enlightened taxpayers will. The Waccamaw diversion proposal should be dropped right now and the money saved.

I just stressed six points. There are a lot more. They are all thorny but I thought they should be brought to the attention of this gathering.

Thank you.

CHAIRMAN GARDNER: Anyone on the panel have any questions?

MR. LINTON: Mr. Chairman, I would like to address myself to one of Mr. Baldwin's statements indicating that one additional measure of pollution would be introduced into the Cooper River by virtue of the use of the Bushy Park site just north of Charleston.

Within the realm of your experience, is it possible to utilize this particular development for the purpose it was intended and accomplish what you have suggested?

MR. BALDWIN: Well, it would depend on the type of industry, I am sure. I would think a pulp mill putting out X number of pounds of lignin, and other products, would not be desirable.

If you are familiar with some of the great lakes in the lower Delaware River, with their refineries, I certainly can't see where a refinery would be a good thing.

I have been assured by people who should know that the dye works that is planned is not going to do anything to interfere with the well being of Charleston citizens, living on Charleston harbor. That is all I know about that.

I am sure that the generating plant, which undoubtedly is badly needed, through the outfall of cooling water will probably raise the temperature of the outfall. And that of course is a form of pollution.

I would hesitate to get too involved because there are probably hundreds of industries that could locate at Bushy Park with a minimal damage. But I can think of some that I would hate to see put there.

MR. LINTON: Then, Mr. Baldwin, you are really suggesting a selective program of industries to be installed in this particular site?

MR. BALDWIN: A common failing of conservationists, and I feel that I am one, is that they want to go completely back to the days of the Indians and Daniel Boone and so forth. We have to live with industry. We have to live with shipping. We have to live with the maintenance of channels. So we can't close our eyes to all of them. But obviously -- and it is going to be brought out in this and other meetings -- we have got to start defining the type of pollution that we are doing to ourselves.

COL. ROBERT E. RICH: Just to keep the record straight, on your point 2 concerning the use of the hydro peaking power, I would like to point out for the record that neither the State of South Carolina nor the Federal Fish and Wildlife interests objected to the use of peaking power. And I may point out that the entire concept of the rediversion scheme, as you know, is to reduce shoaling in Charleston harbor or, to paraphrase it, is to reduce pollution in Charleston harbor. I would like to merely point out that this was carefully coordinated.

Point 4 -- and I am in no way supporting or defending your point on the proposed liquidation of Port Royal. I would merely like to point out that subsequent to the initial construction of the inner channels at Port Royal harbor there has been no, repeat no, pipeline dredging done in that harbor.

Thank you, Bill.

MR. BALDWIN: Colonel, to get back to your first point, however, since your reports were prepared, including the contributions of the U. S. Fish and Wildlife Service, their biologists, two or three of their biologists, in private meeting with a group of interested landowners, have brought out the fact that this peak power flow is a poorly understood and potentially very serious thing for the Santee delta. Their contribution, the Fish and Wildlife Service contribution to your coordinated report there, has a sleeper in it, in that they don't mention this in your report. But it is now their thinking. And as working with a group of landowners, we of course have been attempting to have a trial run to see what happens when this tremendous flow comes down the Santee.

COLONEL RICH: I understand this. I also understand that there is a very divisive opinion by these people. They have not changed what they have given to us in writing either locally or at the Washington level at this time. Also, according to the people that I have contacted, there is not agreement among the local landowners. It is primarily the large landholder gun type operation. And there is the divisive opinion.

MR. BALDWIN: It highlights the whole situation, where the individual citizen is the one that has to keep reading the papers and looking around and watching what is going on and try to interpret really what is happening behind the scenes on many of these projects.

Thank you.

MR. JENSEN: Mr. Baldwin, you talked about this interaction between pollution and dredging and filling and estuaries and need for some sort -- at least the relationship of estuarine uses -- community planning, if you want to call it that. Do you have any thoughts or ideas on how you set up an organization to effectively cope with this, within a State? Do you do it on a county by county basis, on a Statewide basis? Should the Federal Government do it? What might your thoughts be?

MR. BALDWIN: I should first say I am a Yankee by birth and I have lived here thirty years, so I hope I am qualified to comment on South Carolina conditions. I think it is deplorable the way we have no industry and no residential zoning. It is absolutely pitiful. The sad part is if it were done on a county by county basis, some counties are not going to play ball. And it is so involved in local politics, I wouldn't dare get involved in controversies that might develop if I went into it here. It is needed. But I can't even begin to suggest how it could be brought about.

CHAIRMAN GARDNER: Thank you, Mr. Baldwin.

I would like to recognize at this time Russell Campbell of the Chamber of Commerce here in Charleston.

Mr. Campbell.

MR. CAMPBELL: On behalf of the Chamber of Commerce I would like to announce that we will be observing the hearing. Mr. Kenneth Johnson, who is The Chairman of our Harbor Improvement Committee, will be an observer on behalf of the Chamber of Commerce, and we will enter a statement for the record later.

CHAIRMAN GARDNER: Thank you.

I would like to also recognize Mr. Clayton Cooler from the city of Beaufort.

MR. CLAYTON COOLER: I don't have anything to say.

CHAIRMAN GARDNER: I would like to recognize Mr. William Cauthen from the State Chamber of Commerce in Columbia.

MR. WILLIAM CAUTHEN: I will acknowledge the recognition.

I also have nothing to say, which is unusual.

CHAIRMAN GARDNER: Thank you.

The next statement, I call upon Mr. Charles Knee, Jr., from the Medical College of South Carolina.

MR. CHARLES KNEE: I am here under somewhat false colors today. I am representing Dr. Richard Hanckel from the Department of Otolaryngology, who is also a member of the South Carolina Pollution Control. He wrote a brief statement and asked me if I would present it to this meeting. And I quote:

"These areas should provide recreation such as fishing, shrimping, oystering, and crabbing by the individual as well as the enjoyment of water sports such as swimming, water skiing, and surfing.

"They should also provide an area where commercial fishermen, shrimpers, oyster harvesters, and crabbers can harvest a worthwhile crop.

"The cash value of the seafood harvest is a matter of record. The intrinsic value to the individual citizens who enjoy the salt water sports noted above is hard to estimate, but I imagine in South Carolina alone it would run into the millions of dollars annually.

"At present all of these personal pleasures and commercial ventures have been either eliminated completely or curtailed considerably because of the water pollution caused by inadequate treatment of sewage and garbage disposal, industrial waste products, and soilage from shipping.

"I strongly urge that appropriate statewide legislation be adopted to provide a uniform minimization of pollution from these sources. I further urge that the individual counties be allowed to modify this basic statewide legislation so as to provide more adequate protection against these or any other sources of pollution, including air pollution.

"R. W. Hanckel, Jr., M.D., Chairman

"Department of Otolaryngology."

CHAIRMAN GARDNER: The next statement, I call upon Mr. C. W. Mathewes, Jr.

MR. C. W. MATHEWES, JR.: Thank you, Mr. Gardner.

I am C. W. Mathewes, Jr. I am appearing today as Chairman of the Industry Committee for Liquid Spillage Control, Port of Charleston.

The national petroleum industry, recognizing a responsibility to assist in the control of air and water conservation, has in the past ten years spent nearly 400 million dollars on pollution control, and is currently spending in excess of 70 million dollars annually on air and water conservation research and equipment.

The petroleum industry, in the Port of Charleston, S. C., enjoys a rather enviable reputation as to spillage over the many years that it has been doing business here. It recognizes, however, that they have a responsibility to plan and prepare for controlling accidental spills that might occur in the future.

As a consequence, under the auspices of the South Carolina Petroleum Council, a local port committee was formed April 5, 1968. This committee originally consisted of the representatives of the several petroleum companies operating water-front facilities in Charleston, S. C., and advisory members from the U. S. Naval Base, the U. S. Coast Guard, the South Carolina State Ports Authority, the U. S. Army Corps of Engineers, and the South Carolina Pollution Control Authority.

Realizing that other waterfront industries might have an interest; invitations were sent to them, and several have accepted the invitation to participate.

The name of this committee is Industry Committee for Liquid Spillage Control - Port of Charleston, S. C.

The purpose and goal of this committee is to develop and evaluate realistic and practical ways and means to control and remove accidental spillage of floatable liquid materials. The committee, as a whole, and its sub-committees are presently actively engaged in such things as, but not limited to:

1. Evaluation of the effectiveness of the several oil spill booms now on the market.

2. The effective utilization of an oil spill boom in Charleston Harbor.

3. Ways and means of storing this equipment and transporting it to the scene of an emergency.

4. Evaluation of the various type chemical dispersants - their immediate effectiveness and acceptance by governmental pollution control agencies and fish and wildlife authorities.

This committee will work very closely with pollution and conservation agencies to insure the ultimate adoption of a program compatible with the interest of these agencies.

At its meeting on May 20, 1968, the committee adopted a resolution endorsing this public hearing as being in the general interest of what is trying to be accomplished, and further endorses the action of the Federal Water Pollution Control Administration in making Requests for Proposals - Development of new or improved methods for the removal of oil or oily mixtures from water surfaces.

The committee requests that the FWPCA make available to it any information developed that might be helpful to the committee in accomplishing its purpose.

Thank you very much.

CHAIRMAN GARDNER: Does anyone have any questions?

I would like to add one comment to what Mr. Mathewes has said. I believe it was the April meeting I attended and it was a very worthwhile meeting and we look forward to a real fine working basis.

MR. MATHEWES: Bill, you want to get on me.

MR. LINTON: No. I want to compliment you.

Chris and I are old friends. We can cuss each other with the greatest degree of satisfaction.

MR. MATHEWES: And effectiveness.

MR. LINTON: I want to compliment you and the oil industries at large, Chris, in connection with the position you have taken, and pledge cooperation of the Pollution Control Authority to the utmost capacity of providing what needs to be provided to take care of emergency spills in Charleston harbor, and which have created such wide concern over the entire globe, and I compliment you on the efforts you have exerted.

MR. MATHEWES: Thank you, Bill. I accept your compliments on behalf of the industry.

CHAIRMAN GARDNER: Next, I would like to call upon Mr. G. R. Hennigar. He is head of the Pathology Department of the Medical College of South Carolina.

MR. G. R. HENNIGAR: I am a pathologist and interested in toxicological pathology for some years, and I come to you today with a warning. The warning has to do with health -- not only health, possibly death.

Mrs. Knisely asked if I would care to say a few words here today about water pollution. Two things came to my mind. One, in 1952 I autopsied six young people between the ages of 18 and 30, who died of a fatal brain infection from an organism found in stagnant water. This, of course, was a traumatic experience.

That was the first thing that came to my mind in terms of water pollution.

The second thing, I asked myself: Have we advanced in our study of toxic effects, chemicals in water, as we have in air pollution? As you are all well aware, it has only been really in the last ten years we have become aware of the dangers of air pollution. In Europe, 400 years ago, when they had chimneysweeps who swept out the chimneys by hand and developed skin cancer, somebody figured something was wrong. It took 400 years for people to realize coal dust and coke could likewise set off cancer in the lung. There are many things that can cause cancer from the air and these are being explored. But what have we done in exploring the potential hazards of chemicals in water? I think a great deal of work has to be done along this line.

The Food and Drug Administration for years has insisted that before things that we imbibe, things that we eat, our medicines, that they be tested and proven by animal experimentation before they are released to the public. Has the Food and Drug Administration, or any other organization, insisted that things that are found in the water be tested before human ingestion by swimming or eating fish? I am concerned about this.

There are many dyes, many dyes, capable of causing cancer of the bladder. There are many lignin salts that are capable of causing cancer of the liver and cirrhosis.

In general, many of the solvents and these wastes from industrial excretion into the water are absorbed by the intestinal tract and toxified by the liver and excreted by the kidney and these are all danger areas.

I am not in a position to say anything specifically about specific industrial poisoning at this time. I am just warning that there is a strong possibility that increase of chemicals into these rivers may affect your health, and a great deal of work has to be done.

Thank you.

MR. LINTON: May I ask the doctor a question?

I would like to point out the fact that your reference is to contact and not drinking water. I would like to ask you, sir, if the pesticide investigation presently being undertaken by the Medical College in cooperation with the United States Public Health Service and South Carolina State Board of Health might offer a potential in connection with the problem that you have referred to?

DR. HENNIGAR: Yes, sir. I am glad you brought that up. Something is being done. Doctor Finklea -- is Doctor Finklea here? Doctor Finklea has been very interested in this and we in the Pathology likewise. Yes, I think these are the things that are going to clarify the significance or non-significance of water pollution.

MR. LINTON: I agree. Thank you very much.

CHAIRMAN GARDNER: Next we will hear a statement from Mrs. Melvin Knisely, League of Women Voters of South Carolina.

MRS. MELVIN KNISELY: I am Mrs. Knisely, and my complete statement is too long to read and I find that the brief statement that I have prepared from it doesn't fit with the rest of these, so I think I better submit the whole thing.

CHAIRMAN GARDNER: Would you like to submit later?

MRS. KNISELY: I would like to submit my long one, yes.

CHAIRMAN GARDNER: Call upon now Mr. Thomas Thornhill of South Carolina Water Resources Commission.

MR. THOMAS E. THORNHILL: Thank you, Mr. Chairman.

Ladies and gentlemen, I thought that our Chairman of the South Carolina Water Resources Committee, Mr. Bell, seated over at the end of the table, was going to make a Committee report first. But in that I have been called upon, I will make this one. This is my personal statement.

For the record, I am Thomas E. Thornhill, 72 Tradd Street, Charleston, South Carolina. I am Treasurer of the Charleston Oil Company, a Major in the United States Army Reserve, Past-President of the Greater Charleston Chamber of Commerce, Past-President of the Charleston Kiwanis Club and a member of the South Carolina Water Resources Committee, representing salt water interests.

This statement is made with the full knowledge of the other members of the South Carolina Water Resources Committee and is intended to supplement the committee's statement at this hearing to express more detailed items which I should be more familiar with as the Salt Water Representative of this committee.

I may point out as an aside that this is a similar statement to that made at the public hearing held last week by the Department of Engineers on study on improvements of Charleston Harbor, and I believe these two things are interconnected.

It is noted that there has been many years of concern on the part of the Federal Government with Charleston Harbor and in the past ten years or more there have been many voluminous reports. I request the Federal Water Pollution Control Administration to encourage the Congress and all agencies of the Department of the Army to implement the Department of Engineer's plan "Survey Report on Cooper River, S.C." dated July 1966 for the control of shoaling in Charleston Harbor, with particular reference to the early implementation concept as specified in paragraph 99, page 39 of

The Engineer's Survey Report. I believe early implementation would better serve the citizens of the United States than to wait until the project completion date, as specified in the report, of January 1, 1975.

It is further noted that in discharging its responsibilities in regard to spoil through the Department of the Army, Corps of Engineers, the policy of the United States Government has basically been to reduce shoaling caused by spoil and where shoaling exists to dispose of it in the most economical means. This policy of "the most economical means" has been resolved through study by the Corps of Engineers to be at this time and for the past twenty or more years the use of cutterhead pipeline dredges with spoil depositories in the near proximity to the dredging operation. The cost of depositories can be estimated. There are, however, many costs that cannot be estimated.

Only a few of these unestimatable costs are itemized here.

1. The almost permanent and unrecoverable damage done to the development of marine life by the filling of marshlands so important to the breeding and feeding of what many experts say will be the greatest food source in the centuries ahead.

2. The loss of the recreational value of the shallow water beaches and marsh areas useful in the life of a growing population.

3. The loss of settling areas for pollution abatement and treatment by the flow of tide in and out of the marshes allowing for nature's oxidation process. This value certainly cannot be overestimated for a growing population and industrial area.

4. The loss of the esthetic value and the denial of this part of nature to future generations.

5. The cost of ever making a spoil area productive. The spoil deposited has proven unsatisfactory for growth of vegetation and it will not support even minimal construction.

It is because of these unestimable losses to future Americans that I request that the policy of the United States Government in regard to disposing of spoil from the rivers and harbors of South Carolina and elsewhere in the nation be changed from "the most economical means" to a new policy of arresting the spoil at its origin and where necessary disposing of the spoil in the most economical means outside of the tidal waters. This means that all available means should be used to end spoil generation and then where necessary the choice of the most economical means of disposal would be to dispose of the spoil either inland or at sea or perhaps to ship it elsewhere to be used as a raw material for some yet unknown process. This new policy would guarantee to our grandchildren that they will have the same use of nature's bounty that our grandfathers had.

This spoil is the greatest problem in pollution to modern harbors all over the country. It is composed of not only loss topsoil of the lands of America but also the sediment from human and industrial wastes of a growing population. The Engineers state that dredges are handling approximately 10 million cubic yards per year in Charleston.

I call your attention to House of Representatives Report No. 1335, 90th Congress, 2nd Session. Among other important information in this report there is the horrifying statement that we have wasted away 200 million acres or 40 per cent of the 500 million acres of fertile soil that this nation had only 175 years ago. This magnifies the need for coordination between the Department of Agriculture whose Soil Conservation Service has the mission of protecting the soil and the Water Pollution Control Authority and the Department of Engineers, so that most of our Federal tax money might be spent saving our land and cleaning our water rather than be faced with the necessity of spending the greater amount to dredge and dump spoil on our shores.

We cannot burden future generations with mountains of unproductive mud nor can we steal from them the unestimatable losses they will suffer by not having the use of the tidelands and the fertile farmlands that certainly their creator must have intended.

For the reasons stated, I request that our Government change its policies in regard to spoil and no longer deposit it on our shores but all agencies work together to arrest it at its source.

And I also might say, Mr. Chairman, that I would suggest to these Government agencies that Charleston Harbor has a unique opportunity to be a pilot project in this area because of its natural resources, its present stage in pollution, its present stage in water resource development in State Government, and also because of its good climate for working year-round on a project of this type.

(Supplemental Statement submitted by Mr. Thornhill to be included in record is as follows:

1. We should record here that the Charleston area has taken steps to clean up its pollution, witness the $40 million currently being spent by 13 communities and military establishments in this area to treat sewage prior to July 1, 1970. The industries of the area are also spending untold sums to meet standards for stream purity as set by the South Carolina Pollution Control Authority. In addition, the Engineers intend to spend $40 million to reduce silt pollution in this area.

2. Much of this hearing has been on studies and monitoring; any of this process done in the estuaries of the Charleston area must be programmed around the July 1, 1970, date and then such studies can tell us what additional treatment is necessary over and above the primary treatment now required by South Carolina law.)

CHAIRMAN GARDNER: Anyone have any questions for Mr. Thornhill?

MR. JENSEN: I have two questions, or related questions. It is very clear that many people need to use the estuaries for a great many things, transportation and recreation, all of these things that you have pointed out.

The question then is, first, how can one go about making these public choices? And the second part of the question is, who should make these public choices? Should this be a city, county, State, State Planning Board, State Estuarine Board, Federal agencies, a collection of Federal agencies, National Council? Do you have any thoughts or answers to these two questions of how and who? Both of which are asked.

MR. THORNHILL: Of course basically I am a States Righter, and also a man who believes in very limited government. In the field of natural resources development, however, I believe that the State has the greatest opportunity and the best representation of the people. I recognize that generally speaking, at least in most programs, the Federal Government has stepped in because the State has failed to act. I would hope that the State of South Carolina is beginning very seriously to act in this regard. It has been a growing process over the years. Mr. Linton has certainly been very prominent in it, and Water Resources Committee now has been organized and been given sanction by the Legislature, and it too is in business and it is working hard, and Mr. Linton serves on that ex officio.

I believe the time has got to come where natural resource protection and preservation must hold the upper hand. The profit motive, of which I am very seriously involved in, as most people in business, generally -- well, I won't say it overshadows other factors in some cases, but some people at least make the profit motive overshadow all other considerations. And this, I suppose, is where government has to step in and make standards on natural resources, because where we have allowed our profit motive to destroy our natural resources, this is not something that we can build back.

And so you have asked, of course, a very knotty question, that can't be answered here in a few moments. But I think basically the State needs to set standards on natural resource protection. And this must be the first consideration in all law. If industry -- and heaven knows we want industry and we have been working hard to get it here -- but we must also ask that industry be kind to our future generations. And if the industry is not, then I as a member of this community and having been and still in the business of asking new industries to come here, if the industry is not willing to protect future generations, then I think we ought to ask that it leave.

I don't know if that answers it.

CHAIRMAN GARDNER: Thank you, Mr. Thornhill.

Next, I would like to call upon Mr. Richard Merritt, from the Merritt Dredging Company.

MR. RICHARD S. MERRITT: Thank you, Mr. Chairman.

My name is Richard S. Merritt. I am president of Merritt Dredging Company of Charleston, S. C. I am a director of the National Association of River and Harbor Contractors whose members do 80 percent of all the contract dredging performed in the United States. I am a past president of the Southeastern Dredge Owners Association whose members do most of the contract dredging in the South Atlantic states.

The first remark I wish to make is that I am a conservationist at heart. I was born in northern Minnesota which is historically known as the "Land of the Sky Blue Water." I can never forget, as a boy, fishing and swimming and drinking the water in those pure lakes fifty years ago.

Fifty years later I am a dredging contractor in South Carolina and I suddenly find myself surrounded by accusations that dredging, per se, is a pollutant, a killer of fish and wildlife, a destroyer of natural resources and an enemy of conservationists.

These accusations are unjust and unproven. Therefore, as a conservationist, and in defense of the dredging industry, I feel it is my duty to incorporate into the records of this meeting the attached testimony which was recently presented to the United States House of Representatives, Committee on Public Works, Subcommittee on Rivers and Harbors.

I will not bore you people by reading all 16 pages of the testimony because much of it is directed to oil pollution problems in which South Carolina has not been involved. I will read only the following excerpt from the testimony appearing on pages 3, 4 and 5 and I quote from the paragraph entitled "Dredging Abates Pollution":

> "It is important for this committee to realize that dredging is a tool for the abatement of pollution. It is not a cause or a source of pollution. There is no oil spillage during the dredging process, except possibly a minor exudence from existing sedimentation in the water being dredged. Dredging is

the only available means for removing polluted materials from the bottom of lakes, rivers and harbors.

"Much has been said about dredging and dredge disposal in connection with water pollution. But, there is no competent evidence to support the presumption that dredging operations adversely affect the quality of water. Tests conducted by the Government also show that after a period of time polluted material deposited in the Great Lakes disposal areas are no longer polluted and that fauna is healthier and appears to be more thriving than in the adjacent lake bottoms.

(1) See testimony Gen. Wm. F. Cassidy, Chief of Engineers, before the Senate Appropriations Subcommittee on Public Works (1968) relating to 'Pollution Tests Near Dredge Disposal Areas.

"Dredging reduces pollution. The dredging process adds oxygen to the polluted materials by exposing the materials through agitation thereby enabling nature to dissolve and purify the materials. Any effort to discourage or lessen dredging will not only impede pollution abatement but will stifle the economic growth and development of inland ports.

"Whatever effect the dredging processes may have on sedimentation or pollution, by spillage, leaking or dumping of dredged materials, it is so infinitesimal that it is incapable of being measured. On the other hand, the benefits to be derived from the dredging are so great and the damages so slight, if any, that the consequences of not dredging completely overwhelms any other considerations."

I have limited my remarks on water pollution strictly to the effects that dredging has on the problem. However, there are some other problems related directly to dredging in the overall picture of estuarine usage and management.

The number one problem is the necessity to provide disposal areas for dredged materials. Even though this is a very touchy subject, it still has to be faced. The economy of South Carolina is heavily dependent upon shipping, both private and military. Shipping is dependent upon ports with adequate ship channels and other supporting facilities. Adequate ship channels are dependent upon dredging. In the foreseeable future with larger and deeper draft vessels, requiring wider and deeper channels, there is no end to our dredging problem. The port of Charleston is already several years behind our competitor ports of Norfolk, Wilmington, Savannah and Jacksonville in the matter of getting deeper and wider ship channels. Three of these ports already are actually dredging deeper and wider channels and the fourth port is only a few months away from commencing dredging. All these ports had spoil area problems similar to Charleston's but their City fathers had more foresight than ours so they have the jump on us now and we need to do something about it.

I honestly believe that the vast majority of Americans, including industrialists and even dredging contractors, are sincerely in favor of conservation of our outdoor natural resources such as wildlife, marine life, woodlands, marshlands, fresh water and estuaries. A program encompassing conservation on such a vast scale will cost the American taxpayers billions of dollars but I think we can afford it if we approach the problem in a realistic, practical and intelligent manner.

The persons who eventually will reap most of the pleasures and benefits from such a program are the millions of small wage-earners who do not pay much in taxes. But that is all right because they work hard and need some place to commune with mother nature. The brunt of the tax load will have to be borne by the big taxpayer, principally industry in general. It is therefore necessary, in the overall planning for estuarine usages, that provisions for profitable industrial operations not be overlooked. Some sort of zoning system may be necessary because without industry there will be a huge lack of tax income and no jobs for the people who hope to commune with nature. I do not think many people are quite ready to go back to the good old Indian days and live off the game and fish provided by the land and water.

Getting back to disposal areas for dredged materials, we must bear in mind two facts: the technological limitations of today's dredges and the economic factor of cost versus benefits when you try to exceed these limitations. Actually, the percentage of South Carolina's marshlands and wetlands needed for disposal areas is so small and the consequences for not having them is so great, it leaves little room for any disagreements except to pinpoint the best locations. Here is where scientific studies, expert planning and unselfish practical cooperation will really pay off.

I heartily endorse the Department of Interior's study of our estuarine problems on a comprehensive basis and I wish to thank you for the opportunity to submit my thoughts on the subject.

MR. JENSEN: Mr. Merritt, two questions. First, who should go about doing this estuarine planning? You mentioned zoning, I believe. Should this be a Statewide planning or should it be a county plan or Federal Government? Do you have any thought?

Secondly, how can industry best have an input? You obviously are one of the user groups. You pointed very properly to this -- well, the need to accommodate many different uses. We have to have harbors, we have to have shipping; there can't be any argument about that, really.

Who can do this planning and, secondly, how can industry have a development in this plan?

MR. MERRITT: I don't believe it can be done by counties, because the areas involved are not counties. I kind of hesitate to say whether it should be State or Federal. I really don't know. The system that we now have is the Federal Government setting standards and leaving it up to the States to work them out. I think this should be satisfactory. I am not much of an authority on that question.

MR. JENSEN: I think we all have kind of the same problem. That is one of the reasons for holding these hearings, to give as many people as possible a chance to present their views and ideas.

MR. MERRITT: I think you are right.

MR. THORNHILL: Mr. Chairman, since Mr. Merritt followed me, I want it clear for the record that certainly I think most of the people in our State at least don't blame the dredger. We blame the spoil and until we find out some way to stop the spoil from generating, then thank heaven for the dredger.

MR. MERRITT: I agree with you. You have got to get back to the source of it.

CHAIRMAN GARDNER: The time has come to hear from one of the silent members of our panel over here. I will call upon Mr. Harry Bell, introduced earlier, as Chairman of the South Carolina Water Resources Committee.

MR. HARRY S. BELL: I am Harry S. Bell, Chairman, South Carolina Water Resources Planning and Coordinating Committee. As chairman of this committee, I take great pleasure in presenting the following statement in behalf of the South Carolina Water Resources Planning and Coordinating Committee.

The South Carolina Water Resources Planning and Coordinating Committee, an agency of state government charged among other things, with "reviewing any project, plan, or program of Federal aid affecting the use or control of any waters within the State and to recommend appropriate action where deemed necessary," takes the following positions with respect to the study of pollution problems in the estuarine areas of South Carolina.

1. The South Carolina estuaries and estuarine areas, having a tidal shoreline of approximately 2,900 miles and including an area of about 425,000 acres of state-owned and controlled salt-water marsh, are an indispensable asset to the state's economy. It is the view of this committee that they should be developed to the fullest extent possible under the multiple-use and preservation concept of the tideland area.

2. The design of the solutions to the immediate problems should take into consideration the potential long-range development of the area, and should also incorporate elements that will assist in alleviating any foreseeable problems.

3. The South Carolina Water Resources Planning and Coordinating Committee recommends that the proposed study take full cognizance of the present and potential problems with all types of pollution. Pollutants should be specifically identified as to source, type, and quantity. The study should include the identification of pollution problems resulting from spoil disposal, present and future, with recommendations for mitigating measures. Corrective measures needed to restore and maintain water quality at acceptable standards should be clearly set forth. It is further recommended that the physical and economical feasibility of central, or group, waste treatment facilities be fully explored and planned where found feasible. The study should extend inland beyond the estuary limit when necessary to identify pollution sources originating outside the estuarine area but later being discharged therein.

4. The South Carolina Water Resources Committee recommends that the study give high priority to defining the relationship between water quality and the propagation and harvesting of shellfish, sports and commercial fisheries. The importance of this resource to the economics of the state warrants special attention, improvement and development toward an expanded coastal economy.

5. The Department of the Army, Corps of Engineers, has held a public hearing in connection with a proposal for studying the feasibility of improving the channels of the Charleston Harbor. Estuary pollution is closely related to this study, and it is recommended that any estuary pollution study on the part of the Federal Water Pollution Control Authority be closely coordinated with the Corps of Engineers' study of the Charleston Harbor channel improvements. This suggests that consideration should be

given to coordinating the two studies in the estuarine areas in the vicinity of Charleston, but not diminishing the importance of such studies in all estuaries of South Carolina.

6. These views are presented in behalf of the South Carolina Water Resources Planning and Coordinating Committee, the officially designated state agency. It is presumed and desired that separate statements be presented by other state agencies on behalf of themselves with respect to specific and separable interests regarding the proposed study.

7. The South Carolina Water Resources Planning and Coordinating Committee requests that it be kept informed as the study progresses, and given the opportunity to review and comment on each phase of the study as it is completed.

8. We welcome the proposed estuarine pollution studies and pledge our cooperation in keeping with the laws and policies of the State of South Carolina and within the capabilities of the South Carolina Water Resources Planning and Coordinating Committee.

MR. WILLIAM P. BALDWIN: I have a question. That is a very comprehensive --

CHAIRMAN GARDNER: Would you please identify yourself?

MR. BALDWIN: W. P. Baldwin.

I just refer to your first point, wherein you indicate multiple-use of the state-owned salt-water marshes. I would like to refer back to one of my points, wherein certain individuals tried to give a 25-year lease to all of the state-owned salt marsh, 350,000 acres, to one phosphate dredging company. Will you in your position be ready to state that you feel that that is a sensible, wise, multiple-use of 350,000 acres of state-owned salt marsh?

MR. BELL: Believing your statement, you have already stated that question was pretty much settled and that 350,000 was reduced to some considerably smaller figure, have you not?

MR. BALDWIN: It was only settled because our attorney turned on so much heat that finally it was qualified to be 25,000 acres, based on the authority of the State geologist saying that is where most of the phosphate was anyway.

But my question still remains. In your first statement of a good multiple-use for state-owned salt marshes, are you prepared to say that phosphate dredging of extensive acreage is okay, as a multiple-use?

MR. BELL: I don't think that I could say the large acreage referred to would be in line with this statement.

MR. BALDWIN: Thank you.

CHAIRMAN GARDNER: I call upon now Mr. J. F. Mixson, International Paper Company.

MR. J. F. MIXSON: Thank you, Mr. Chairman. I am a member of the State Water Resources Planning Committee, and I represent one of three members who are representing industry.

My name is J. F. Mixson, and I am speaking as Manager of International Paper Company's mill at Georgetown, South Carolina. For over 30 years we have operated a large pulp and paper mill in Georgetown County and have major investiments in timberland and equipment in other parts of the State. The installation in Georgetown employs over 2,000 people. A number of other people not employed directly by the Company are employed in supplying wood to the plant. Annual expenditures for payrolls, raw materials, operating expenses, and freight are over 56 million dollars. Annual taxes paid to City, County, and State amount to over 1 million dollars.

We quote these figures to demonstrate that we are a substantial, permanent citizen of the community and are interested in all facets of the community welfare, estuarine waters included. Our operation depends on water for our very existence; therefore, we appreciate the opportunity to present our views on the optimum use, value, and other aspects of estuarine resources.

Our company has a past history of cooperating and working with the South Carolina State Pollution Control Authority. We feel that this relationship continues today as indicated by our cooperative agreement in spending 1.25 million dollars for additional waste treating facilities to protect the estuary on which the Georgetown Mill is located. We also make and have made periodic river and bay surveys to determine water quality and the effects of our effluents on the river systems in our area. We have been working under the South Carolina Pollution Control Law since its adoption by the State and wish to make the following observations:

The estuarine waters of the State are recognized as to their importance by their specific inclusion in the State Law, Section 70-101, as being under the jurisdiction and control of the State Pollution Control Authority.

This inclusion in the law means that the estuaries are important to all segments of our society. They provide opportunity for fishing, transportation, industrial use, recreation, etc.; therefore, we recommend that any regulations or changes in regulations of the use of estuaries be made with due consideration of all of these uses.

The policy of the State as declared in State Law 70-102 provides for multiple use of all of the waters of the State, estuaries included.

This multiple use concept is stated in such a positive manner in the law that it should be quoted as part of the record of this meeting. And I quote:

> "It is hereby declared to be the public policy of the State that reasonable standards of purity of the waters of the State be maintained, consistent with public health, the public enjoyment of such waters, the propagation and protection of fish, shellfish and wildlife, the operation of existing industries and the future industrial development of the State with a reasonable balance of consideration of the public welfare, and to that end, that the use of reasonable methods to prevent and control pollution of the waters be required."

We feel that this policy as declared could hardly be improved upon in obtaining the optimum of the State's estuarine waters.

If further regulation of estuarine waters is contemplated, it should be borne in mind that each estuary is unique into itself with widely varying temperature, salinity, and suspended matter both because of the tidal effects and the uses of the estuaries. Any regulation must, therefore, give consideration to the individual estuary and must be studied on a scientific basis. State Law, Section 70-110, authorizes the State Pollution Control Authority to conduct studies and research with respect to pollution abatement or control problems. We feel that studies under the direction of the State Pollution Control Authority are authorized by law and therefore should be made prior to any changes in regulations.

In summary, we feel that estuaries are valuable resources, providing their optimum value through multiple use. The effective management of the estuaries of the State can be achieved within the framework of existing laws, and further regulations should be arrived at only as scientific evidence can be gained to support such regulations. We plan to continue cooperation with the various agencies of government in achieving optimum utilization of these valuable resources.

Thank you, Mr. Chairman.

MR. LINTON: Mr. Chairman, I would like to reserve the right to comment on Mr. Mixson's statement at a later time.

CHAIRMAN GARDNER: Call upon now Dr. Robert Lunz, of the South Carolina Wildlife Resources Department, Division of Commercial Fisheries. Doctor Lunz.

DR. G. ROBERT LUNZ: Mr. Chairman, I unfortunately have four statements I have to make. I would like to get rid of one of them as soon as I can.

This is a statement for the Trustees of the Belle W. Baruch Foundation.

"The Trustees of the Belle W. Baruch Foundation want you to know that they are vitally interested in pollution of and the effects of pollution on estuaries. They have an active marine resources program and have granted $100,000 for this study.

"Secondly, the Foundation has recently given an easement on something over 500 acres of marsh and tideland to the South Carolina State Ports Authority for the disposal of spoil from the Georgetown Harbor. They hope that this will solve spoil disposal problems for sufficient years so that long-range programs of disposal other than in the marshes can be evolved.

"Finally, the Foundation requests the privilege of submitting a written statement for the record at a later date."

If you don't mind, I would next like to make a statement for the Atlantic States Marine Fisheries Commission. When the Atlantic States Marine Fisheries Commission was established, 77th Congress, 2nd Session, it was concerned with the marine fisheries of the compacting states and its coastal waters. In 1950 it made a survey of pollution, pollution in waters, and economic importance of controlling pollution through the seaboard states from Maine through Florida. The Commission's interest in well being of the waters has never slackened.

In 1956 there was submitted a statement of policy and guidelines for effective actions in developing and managing estuaries. This was officially adopted by the Commission on October 7, 1966.

(The paper is copied into the record as follows:)

DEVELOPING AND MANAGING ESTUARIES

A Statement of Policy and Guidelines for Effective Actions

The most useful aquatic areas in the world are in serious danger of destruction. The estuaries, where fresh water, land and sea meet in a dynamic and productive zone, are gravely threatened through unwise and unplanned excessive use of their valuable capacities. Specific problems in estuaries vary almost infinitely, but guideline policies are pertinent to most of the management problems involved. This statement presents such suggestions related to policies.

Estuaries include the coastal zone which is affected by both the run-off of fresh water from land and the salt water from the sea. This zone includes tidal rivers, marshes, bays and river mouths, the inshore edge of the ocean, and the land areas which interact with these. Policies for use of these areas should be bases upon the natural resources contained in this great coastal zone and upon the complex human uses made of the zone.

The value of estuaries is well established - but appreciated by only a tiny group. It is not appropriate to provide here detailed statistical summaries, but the intense uses being made of coastal waters must be noted because they are so expansive, so competitive and potentially so destructive. All shipping for industrial or military purposes begins and ends in estuaries. The wastes of the great coastal industries and of a third of the people in this country are poured into these waters. About three-fourths of the fish and shellfish needed for food production and recreational fishing are totally dependent upon finding suitable conditions in estuaries. The coasts are in exploding demand for aesthetic and recreational use.

Each of these is an important human use - but shipping requires dredging and spoil disposal and too often produces destructive oil slicks or spilled toxic cargo. Treated sewage ruins healthy water by over-enrichment, and poisonous industrial wastes are still increasing. Even aesthetic use, which almost sounds above reproach, irretrievably destroys the ecosystem when vast areas are dredged or filled for housing - so that part of the reason for moving to the shore no longer exists. All of these uses, and others, have developed without comprehension of their effects and interactions and without plans for an optimal balance for present or future human uses. Present and potential uses involve vast and complicated economic problems, political and geographic difficulties, grave social questions and frightening legal complications. Nevertheless, they must be resolved, since the uses and abuses of estuaries are now unmanaged, irrational, and often absolutely imcompatible.

The estuaries are complex. A marvelous and productive ecosystem has emerged slowly over thousands of years. The river, the land and the sea all make essential contributions. Biologically, the estuarine zone contains a unique mixture of species which produce very large crops. Some species are permanent residents, taking full advantage of the capacity of the estuary to trap nutrients. Others use the estuary as the ocean's greatest nursery or as a grazing area. The estuarine ecosystem is not yet fully comprehended, but enough is known to show that the entire system can be easily damaged or permanently destroyed if detrimental changes occur in the river, or nearly land or marsh, in the coastal ocean or in the estuary itself. It is extremely easy to destroy quickly resources which cannot be renewed as rapidly - or to destroy permanently and irreversibly an essential link in the estuarine ecosystem.

As guidelines to effective management of these areas, the following specific proposals are made:

1. The objectives of estuarine management must be identified and agreed upon.
2. An adequate inventory must be made of the estuaries and of their present and potential human uses.
3. Research must be intensified to provide the bases for rational decisions.
4. Controls must be established over the alterations which are occurring and those which will be proposed.
5. Immediate action should be carried out at all levels of government toward improved management.

All of these are urgent requirements and very difficult tasks. Many points of view must be expressed and reconciled, and the Atlantic States Marine Fisheries Commission suggests that the following comments may provide some initial stimuli:

In selecting objectives:

a. Multiple usage exists and will be intensified. A rational balance among such uses will be required.

b. Long-term objectives must take clear precedence over short-term gains. This is especially critical when a short-period use would destroy an essential link in the ecosystem.

c. The objectives must be consistent with the basic principles of biology, chemistry, physics, economics and government or they are doomed to failure.

d. Objectives will inevitably vary from place to place and from time to time. General objectives must, however, be sought for large coastal areas and specific objectives must be clarified for each watershed system.

On taking inventory:

a. In general terms, our estuaries have never been properly described. Good management will require thorough description of these areas and resources, careful analyses of all of their present uses and projection of the best possible estimates of future uses.

b. Inventory must also include measurements of present and potential damage and losses, based upon reasonable measurement and prediction.

c. Valuable leadership has been given by such States as Massachusetts, New York, Delaware and others, by the federal-state efforts toward an estuarine inventory along the Gulf of Mexico, by the wetlands surveys of the Bureau of Sport Fisheries and Wildlife, by the new program of the Marine Resources Committee of the Belle W. Baruch Foundation and by other agencies and individuals. These now provide useful assistance, but will not alone be adequate.

d. Inventories must be carried through to estimates in terms of measurable economic value.

e. Adequate and standarized methods for inventory are generally lacking. They are urgently needed and should be developed at the earliest possible moment.

f. Statistical systems for recording and analyzing the many uses of estuaries are insufficient. They must be improved and more widely utilized.

On research:

a. Although present levels of research in estuaries are impressive, the emphasis is very recent. Knowledge is far from sufficient to provide the specific details and broad principles which must be available for optimal management.

b. Research should be carried out at all pertinent levels of basic science and of applied science. The upper limit should be set only by the availability of competent scientists. Research should be supported at colleges and universities, in private industry, at State and Federal laboratories, and wherever else competence may appear.

c. Biological research is especially needed on the life history and requirements of useful species, on the causes of natural and man-induced fluctuations in abundance, on the biological effects of various modifications in the coastal environment, and on the flow of energy into and through the various estuarine ecosystems.

On control:

a. Jurisdictional responsibilities must be clarified. These will be very difficult indeed, since they involve private owners, towns, counties, states, the national government and occasionally international groups. These often involve traditional and jealously guarded patterns. It is also true that ownership often differs from jurisdiction for management (by health controls, fishing regulation, pollution laws, etc.). Without clarification of jurisdiction, however, optimal management can never be achieved.

b. Traditional responsibilities of the states and of the Federal government are central to effective controls and merit urgent attention and clarification.

c. Controls cannot be adequately designed or effectuated without prior selection of objectives, inventory and research.

d. In view of the present rapid degradation of our coastal areas, interim controls are imperative. These must be conservative. We suggest that controls must be most conservative where knowledge of effects of change is weakest.

e. Zoning of specific locations and areas of estuaries appears to be an essential tool for management. There is substantial danger, however, that zoning may be carried out with insufficient regard for the essential unity of the estuarine system and without proper attention to the distant effects of local uses.

On action:

a. At the LOCAL level, we urge

(1) public education on estuaries.

(2) analysis of legal problems in management.

(3) specific conservative controls when pertinent.

(4) acquisition of title or the development rights of border lands and waterways in the public interest.

(5) zoning of coastal areas, based on a conservative approach and implemented by strong regulation.

b. At the STATE level, we urge

(1) public education on estuaries.

(2) formal and definitive analysis of legal problems, with development of specific corrective legislation.

(3) firm and conservative interim control of the uses of the estuary, especially for

(a) domestic and industrial waste disposal.
(b) dredging and spoil disposal.
(c) destruction of wetlands.

(4) through inventory of present and future values and losses, in close cooperation with other agencies.

(5) through monitoring of present water and land quality and of changes occurring in that quality.

(6) rapid acquisition of appropriate estuarine areas,

(7) fresh and comprehensive development of objectives, policies, plans and practices for the optimal management of estuarine areas.

(8) support and encouragement of research on the estuary, to permit protection of present values, prevention of destruction, and positive achievement of the optimal values of these areas.

(9) effective coordination of the many government agencies involved in estuarine use and management.

c. At the INTERSTATE level, we urge

(1) support of public education on estuaries. For the Atlantic State Marine Fisheries Commission, this will include preparation of a leaflet of excellent quality on the nature, values and optimal uses of estuaries. This could be widely distributed to public officials for present guidance and to schools for education toward the future.

(2) vigorous support of State and Federal efforts toward development of objectives, inventory, research and control.

(3) further expression of a strong and persuasive statement of policy on estuaries.

(4) development of suggested legislation on estuarine development and management.

(5) improvement of mechanisms for dealing with situations, where two or more states are involved in estuarine problems.

(6) interstate planning for protection and enhancement, as is being accomplished by several river basin commissions.

d. At the FEDERAL level, we urge

(1) public education on estuaries.

(2) efficient coordination among the several departments and multiple agencies which are involved in estuarine responsibilities.

(3) appropriate research by Federal agencies and support of research by other competent agencies and individuals.

(4) special leadership in development of methods for inventorying estuaries, evaluating the uses of estuaries and expression of Federal policies.

(5) continued acquisition of appropriate areas, through Federal or cooperative Federal-State programs.

DR. LUNZ: (continuing) The entire report is certainly too long to read. I have urged the co-chairman here to study the paper and see what can be done with it. I am not being at all modest. I am telling you I was one of the authors. I think it is an excellent paper.

It is a toss-up which of my four follows. I opt for Bears Bluff Laboratories.

Bears Bluff Laboratories has been actively engaged in estuarine research since its beginning in January 1946. Its research has given convincing evidence that: (1) the estuaries, particularly the marsh lands, are the most important part of the marine environment; (2) all of South Carolina's marine commercial fisheries is utterly dependent on the estuaries; (3) changes made in these estuaries affect the fisheries of other states as well, since experimental tagging of crabs and fin fish by Bears Bluff Laboratories showed that some crabs were recovered as far away as Jacksonville, Florida, and fin fish tagged in South Carolina were recovered as far south as Florida and as far north as Massachusetts; (4) achievements in aquiculture in salt water ponds, begun in 1946, have demonstrated that a one-acre salt marsh pond is able to produce much more protein food than a comparable acre of farm land. With these findings, is it any wonder that Bears Bluff Laboratories has taken a strong stand against pollution and destruction of estuaries and marsh lands?

So few appreciate the value of estuaries and marshes. Permit me to illustrate their worth thus: In January, 1965, I submitted a written statement to the U. S. Department of Health, Education and Welfare for a pollution hearing on the Savannah River Basin. In that paper it was pointed out that a 63.3 acre oyster lease had to be abandoned because of pollution of South Carolina waters from the Savannah River. In that paper it was pointed out, too, that this lease was in South Carolina and they were crossing State lines. Nearby a small oyster producer in unpolluted waters has been growing and harvesting 220 bushels of oysters a year from each acre of leased land. The U. S. Fish and Wildlife Service reports that each bushel of South Carolina oysters yields 5.53 pounds of oyster meats. Thus each year that the 63.3 acre oyster lease was rendered unproductive because of pollution 77,011 pounds of nutritious protein food, in great demand, was kept off the market. As near as can be determined, the U. S. Public Health Service and the South Carolina State Board of Health first closed this oyster lease in 1948 - twenty years ago. Therefore, because pollution has not been stopped at its source, 1,540,220 pounds of prime food was not produced. At present day retail prices this means that oyster meats valued at $2,310,000 were denied the public.

I never like to put dollar values on these things but this is one case where I think you ought to know what that has cost us.

This one more and I will be through.

The South Carolina Wildlife Resources Department, Division of Commercial Fisheries -- I am a director of that -- under authority of Article 1, Chapter 2, of the Code of Laws of South Carolina, 1962, as amended, is responsible for administering the commercial fisheries of the State. One act included in that portion of the Code administered by the Division is Section 28-754. This reads as follows:

> "Certain Waters Common for all People of State. -
> The waters and bottoms of the bays, rivers, creeks and marshes within the State or within three miles of any point along low watermark on the coast thereof, not heretofore conveyed by grant from the General Assembly or lawful compact with the State, shall continue and remain as a common for the people of the State for the taking of fish, subject to the provisions of this chapter and any future act that may be passed, except that this section is not intended to regulate fish or fishing in the fresh waters of this State."

That is the whole section.

This trust was committed to the predecessor of the Division of Commercial Fisheries at least as early as 1924. Certainly if the marshes and estuaries are destroyed or damaged by pollution then these lands are not continuing and remaining as a common for the people for the taking of fish.

Both the Federal Water Pollution Contr Administration and the South Carolina Water Resources Committee are urged to use their efforts to help us keep this trust.

And now the fight is on, gentlemen.

MR. LINTON: Mr. Chairman, I want first to comment in connection with the statement that Bob just made -- the fight is not on. We are not here to try anybody. It is the purpose of this meeting to obviate any indiscretions or indecisions, or lack thereof. Our object, or the object as I understand of this meeting, is to arrive at ways and means of doing a job which needs to be done and which is already authorized by the Congress of the United States, vested in the Water Pollution Control Administration of the United States Government, with which Bob Lunz and I both are going to cooperate.

I would clarify just one point that Bob made. The reference that he made to the pollution of the 63 acres in South Carolina was caused by pollution from the other State, not South Carolina.

Now, Bob, you wear almost as many hats as I do. But actually, I want to ask you just one question, in connection with a statement you made, and you hit the problem, Bob; and that is enrichment of the waters in the coastal area. Your reference to the fact that treated sewage will ruin the estuarine waters makes me shake in my boots. Would you have any ideas as to how to obviate this problem, when of course it is necessary that bowels move and disposal take place? Would you give me some suggestion as to how to eliminate the discharge of treated wastes, or are you suggesting that subsequent investigations and experimentation be done to further clarify the effectiveness of known waste treatment plants that are not known at the present time?

DOCTOR LUNZ: As I understand, Bill's point was whether I would answer how could we get rid of this over-enrichment of the estuaries by discharge of sewage into the area. And what I was trying to say, when I walked away from the microphone, was that I don't think the primary treatment as we plan Charleston harbor will get rid of this enrichment. I am not sure. I have a sort of feeling -- and I am answering this without really any authority -- I think temporary treatment would certainly help get rid of the enrichment which you are getting through discharge. I am not in a position to do more than hypothesize that maybe that enrichment is ruining or causing the fluctuation in our shrimp box. This takes a long time, to go into details. I do think that what you have to do is do a little more study in this pollution disposal and see if we can't come up with some better answers, just as we are doing now with disposal of spoil.

MR. LINTON: I couldn't agree with you more, Bob. I think there is a wide gap of what we actually know about waste treatment, and what might occur over a period of time after introduction into the water. I think that investigation and subsequent study is indicated here. And I am awfully pleased to have the opportunity to be here and hear what is being said in connection with these problems that have been hounding me for the past twenty years. And the enrichment that is taking place, not only in South Carolina but all over the United States, is a matter of life concerning the coming generations and unless we do obviate the machanism by which carbon-nitro ratio is a contribution to the process in our estuarine waters, then we are not playing square with our progeny.

DOCTOR LUNZ: The Chairman says I might take a couple of seconds more on this thing because some of you may be interested.

The shrimp fishery is the most valuable fishery in the world. It is the most valuable fishery to South Carolina. At the laboratory we have been attempting for a good many moons now to breed shrimp in captivity. We have not been too successful. But we know one thing: when these eggs hatch we have to feed them and we have to feed them diatoms and algae. We know this is what will happen: If you feed a little larvae shrimp with five diatoms, they will take them. If you try to feed them with eight, they will refuse them. When you enrich Charleston harbor with too much nitrogen, too much materials enrichment, you may be -- I say only may be -- you may be growing another type of diatom at the expense of the one the shrimp has normally fed on all these years. So you may be destroying your shrimp crop through the enrichment of your sewers. This is the hypothesis.

I have got to answer Mr. Jensen's question. I suppose you were going to ask me whether I thought planning should be on a county, State or Federal. I might say this: Except for the protection of some of my good friends I probably would not be in the employ of the State of South Carolina now because I once foolishly stuck out my neck and I said I think it ought to be the Federal Government that controls this because then we would eliminate a lot of the arguments we have among ourselves within the State. I still feel that way.

MR. JENSEN: The other question that I was going to ask: Do you see any opportunities for constructive use of these nutrients from the municipalities? Is there a possibility that the marshes themselves, which are big energy conversion systems -- you think there might be some opportunities for studies to see how the marsh itself might be fitted into this entire problem of getting rid of these wastes from our communities?

DOCTOR LUNZ: Yes, I agree with you. I am not really capable of responding to that. But I think certainly marshes and the enrichment from the sewers could be utilized to some advantage if we only knew how and started studying it.

Is that begging the question?

MR. JENSEN: I think it is probably about as far as you can go on it. Certainly there are some other people who have been thinking about this. I wondered what your thoughts were.

A VOICE: Mr. Chairman, I have heen concerned with this particular problem myself. Pennsylvania State University has done studies on the use of human effluent treated primarily as a crop fertilizer. And they have found that this will not only increase the yield per acre of crop, it increases the nutrient values in the crop itself and helps to raise or recharge the subsurface water reserves in the particular area. They found for a city of 100,000 population this required about 1300 acres of active crop land for yield of treatment of sewage.

CHAIRMAN GARDNER: Is the State Senator James Waddell with us at this time?

MR. E. B. BOYER: I am not James Waddell. My name is E. B. Boyer, and he asked me to please bring his statement over today. I would like to submit it.

I am E. B. Boyer from Beaufort. I am Director of the Development Commission in our county.

I have three statements, which I will not read. One is from a citizen of our county, Roger Pinckney. He asked me to bring his statement in.

One is from our County Delegation , which consists of Senator Waddell, Representative Harvey, Representative Graves. And the other is from the County Development Board. I would also submit those.

I have nothing more to add other than I am violently opposed to the suggestion that the port of Port Royal be closed.

(The statement of Roger Pinckney is copied into the record as follows:

"The waterways in the vicinity of Daufuskie Island, Beaufort County, South Carolina, have been posted for some time as being condemned for oyster gathering due to pollution of the Water. This covers quite a large area of our county. I have been informed that the source of this pollution is Savannah, Georgia, and the vicinity thereof. This pollution has been under study for some time and as far as I know no corrective measures have been taken. The nature of the pollution is both from sewage and industrial wastes according to information that I have received. I am also of the opinion that other forms of sea life besides oysters are affected.

"The condition that exists is quite detrimental to the economic status of this section and there is a loss to the County and State from tax revenue. Contemplated development of this section hinges partially on this problem.

"Several residents of Daufuskie Island have requested my assistance on several occasions to intercede in their behalf regarding this pollution of the salt waters as described herein.

"I appreciate your invitation to present this statement, and I respectfully request that this letter be entered into your files and that due consideration be given to corrective measures as may be required, and that I be informed of your action. I am not representing any organization, but am writing as an individual.")

(The statement of Beaufort County Legislative Delegation is copied into the record as follows:

"We would like to be on record as strongly endorsing any program which will control and reduce pollution in our tidal areas.

"In Beaufort County we have a very serious example of water pollution effect on commercial fishing. As the result of sewage and industrial wastes entering the Savannah River at and near Savannah, Georgia, the shell fish industry, in water adjacent to Daufuskie Island, has been discontinued. This in turn creates an economic hardship on the people involved and as a result the State of South Carolina and the Government of the United States have spent a vast amount of money in an effort to assist these citizens. Strict controls preventing the polluting of the Savannah River would greatly alleviate this situation.

"We also realize the damage to our waters from the sewage of the towns of Beaufort and Port Royal. Preliminary studies are being made toward creating a sewage district covering the entire area including the two towns. This is an expensive program and any assistance available from the State or Federal Government should be forthcoming as quickly as possible.")

(The statement of the Beaufort County Development Commission is copied into the record as follows:

"The Beaufort County Development Commission is charged with the responsibility of directing the over-all economic growth in the area.

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(The statement of the Beaufort County Development Commission is copied into the record as follows:

"The Beaufort County Development Commission is charged with the responsibility of directing the over-all economic growth in the area.

"Daufuskie Island in the southern part of the County has suffered a serious setback as a result of water pollution in the Savannah River. Industry waste and sewage from Savannah has polluted the water adjacent to the island to such an extent that the shellfish industry has virtually become extinct. Strict pollution control regulations, which were enforceable, would in all probability correct this very disastrous condition.

"The waters of the Beaufort River near the town of Beaufort and Port Royal are also polluted to the extent that shell fishing is prohibited. Feasibility studies are being made in an effort to create a sewage district to include the general area as well as these two towns. As this is a very costly project, any financial aid and/or assistance available from the State or Federal Government should be granted at the earliest possible date.

"Thank you again for your invitation and if we can be of any assistance from this office please do not hesitate to contact us.")

CHAIRMAN GARDNER: I understand that Mr. Julian LeaMond of the South Carolina Legislature is also here.

MR. LeaMOND: I am here, sir, and listening, and I would like to ask Mr. Linton one or two questions when he gets to the mike.

MR. LINTON: I am at his disposal. I work for him.

CHAIRMAN GARDNER: It has been suggested to me that Mrs. Knisely might desire to come forward at this time and present her statement.

MRS. MELVIN KNISELY: Before I start, the League of Women Voters is not an organization which goes into technical details in depth. We are actually more interested in having more of the citizens take part in government. So my prepared longer statement had some discussion of that. But when I shortened it, I took out everything technical about spoils and marshes, and just discussed how we might get together on agreeing on some of the things that need to be done. And I thought that it just wasn't appropriate until Mr. Jensen started talking to Mr. Thornhill about, well, who should make these decisions, et cetera. And so then Doctor Lunz thought it would be appropriate to read it.

I am Mrs. Melvin Knisely, Water Resources Chairman for the League of Women Voters of South Carolina. First, may I thank you for the opportunity of making a statement at this hearing, and say that we are delighted to find that so many people, with such diverse interests, have been invited, each to present his point of view. We believe that democratic government depends upon the informed and active participation of its citizens.

There is a tendency to assume that the Federal Government holds full sway in water resource planning. This assumption is not true, nor would the nation be served well if it were. The greater part of the planning, construction, operation, and supervision in relation to water resources is done by private corporations and by State and local governments. Recommendations have been made typically by agencies with responsibility for construction. Until very recently these full-development plans usually were based primarily on economic and financial considerations -- the single best plan.

The ideal would be to present to the public information about practical and coherent alternatives, both in development and objectives, so that the people might have a chance to discuss those choices and, through their representatives, to express their preferences before a final decision is made.

Public discussion of alternatives, properly conducted, would tend to eliminate the problems that arise when the public belatedly realizes the consequences of a decision already made. Most decisions except those that require preservation of the status quo, once implemented, are irreversible.

The aim of long-range planning is a maximum social value. The benefits and costs which are readily measurable are those that can be measured in monetary terms. Even when monetary values are assigned to recreation, and to fish and wildlife, these values may not reflect the essential element of quality. Both types of benefits exist and are important. What is needed is a balancing among benefits.

In a democratic society the political process weighs incommensurate values and makes choices. Regardless of the level of scientific understanding or technology, judgment in selection of choices will always be required, and in the face of diverse and conflicting demands.

May I repeat, therefore, that we are pleased to see that so many citizens, and from such diverse points of view, have been given the opportunity of expressing their opinions at these public meetings on our estuaries, over the United States.

MR. JENSEN: Are you acquainted with the study that is being made of San Francisco Bay at the present time by the San Francisco Conservation and Development Commission?

MRS. KNISELY: I have read of it.

MR. JENSEN: This is a very broad study that is being conducted by a citizens group, which was initiated primarily by a citizens group in the

San Francisco area. I think that they are doing out there exactly the sort of thing that you were talking about here just a moment ago.

MR. THORNHILL: Mr. Chairman, may I say for the record Charleston also has done many studies. And we found the problem. The next thing is what to do about it.

CHAIRMAN GARDNER: I call upon now Mr. Bruce Nelson, the University of South Carolina.

MR. BRUCE W. NELSON: Thank you, Mr. Chairman.

I appreciate this opportunity to represent both the University of South Carolina, where I am Dean of Arts and Science, and the group of scientific investigators who devote themselves to understanding the dynamics of estuaries. As a member of this latter group, I have studied estuaries in South Carolina, Virginia, and elsewhere for about a dozen years. Anyone who has spent that much time coping with the complexities of estuaries appreciates that their proper management as public resources will not be easy. Both technical understanding of their complexities and enlightened judgment between competing management alternatives will be required, if these resources are to be preserved and to serve the greatest public good.

The effects of estuarine pollution and solutions for its abatement are part of the general problem of environmental quality that has been considered in the following reports:

Ref. 1. Environment Pollution, A Challenge to Science and Technology, 1966, U. S. House of Representatives, Science and Astronautics Committee Report, 60 pp.

Ref. 2. Restoring the Quality of Our Environment, 1965, Report of the President's Science Advisory Committee, 317 pp.

Both reports contain recommendations for the management of estuarine resources, and they ought to be considered fully when the final recommendations of the National Estuarine Pollution Study are formulated.

The general recommendations in the reports above need to be related to problems that are relevant specifically to estuaries in South Carolina and other states and regions, because the estuaries in each region possess a distinctive environment framework. Some distinctive features of the environmental framework in South Carolina follow. First, the rivers that flow into the estuaries are of two types. The Pee Dee, Santee-Cooper, and Savannah rise in the Piedmont region. They are subject to a pronounced annual cycle of freshwater discharge, and during freshets and floods they transport abundant supplies of suspended solids from the semi-tropical soils of the Piedmont to the estuaries. Siltation is a problem in the estuaries. The variations in freshwater discharge cause large fluctuations in the degree of stratification and the nature of the fluid flow pattern in the estuaries. The Black, Ashley, and Edisto are coastal plain streams. They are largely free of suspended sediment and, as a result of high infiltration rates in their drainage basins, they are subject to smaller variations in freshwater discharge. Estuaries of such streams generally are free of siltation problems and possess more constant stratification and flushing characteristics. Generally, then, the chemical quality of the water and the hydrography of estuaries depend upon the nature of their tributary streams and their drainage basins. These variables change in different geographic and geologic regions.

Second, tributary streams of South Carolina estuaries have a low density of urban and industrial centers. Only Savannah Harbor and Charleston

Harbor are subject to pollution from urban areas of greater than 100,000 population. Most of the tributaries flow by urban centers of only 10,000-50,000 population. Many such centers are located at sufficiently great distances from the estuary so that the stream can recover from modest pollution effects before the estuarine zone is reached. Thus, the geographic distribution of potential pollution centers over the tributary region affects the pollution abatement problems that must be dealt with.

Third, the ocean into which South Carolina estuaries flow cannot be considered a limitless reservoir and the individual estuaries cannot be considered entirely independent of one another. The ocean reservoir on the continental shelf of South Carolina is relatively shallow and it is bounded about 55 miles from the shoreline by the Gulf Stream system. Brackish water discharged from the estuaries flows outward at the surface and is deflected southward by the coastal currents that move southwest near the shoreline. Offshore the currents move northwest parallel to the Gulf Stream until they are deflected inshore at Cape Hatteras. Thus, the continental shelf circulation is a large gyre in which water moves counterclockwise between the coast and the Gulf Stream. Pollutants disperse into this not limitless reservoir, and possibly they exchange between one estuarine system and another along the coast.

The environmental framework of South Carolina estuaries gives each of the estuaries in this region individual characteristics. Each water body will have its own peculiar pollution and pollution abatement problems, and these will require individual solutions.

Estuarine resources should be managed for optimum use. This is quite a different thing from multiple use. Multiple use generally allows any use that individual enterprise conceives and believes desirable. Entreprenuerial use of estuaries frequently preempts uses that are in the greatest public interest. This situation requires government management to insure that estuaries are used optimally in the public interest.

Some optimum uses for estuaries include: recreation, water supply, sport fishing, commercial fishing, commercial harbor, navigable waterway, conservation district, etc. In South Carolina, Charleston Harbor has become a commercial port, and this use preempts such activities as commercial and sport fisheries, recreation, etc. The commercial activities and the population base require that a certain degree of pollution developing from these sources be tolerated. The main restriction on the degree of pollution is that the environment must not become pathogenic for the resident population. The estuarine portions of Myrtle Beach, Edisto Island, Hilton Head, etc., optimally are employed for recreation and sport fisheries. This preempts their use for industrialization. Their scenic and environmental health aspects need to be maintained at the highest levels. But it is noteworthy that the environmental setting of South Carolina estuaries implies that Charleston Harbor and our recreational areas are not entirely independent of one another. The continental shelf circulation connects them and the ocean reservoir is limited. The possible exchange of modestly polluted water that is allowable in Charleston Harbor with recreational areas elsewhere along the shore suggests that we might wish to be more conservative in our control of Charleston Harbor pollution conditions than we would if Charleston Harbor were an independent estuarine region discharging into a limitless ocean reservoir.

In order to manage estuarine resources for their optimum use we must control environmental quality. Quality standards relevant to different uses must be established in terms of measurable properties of the environment. In the case of some toxic substances, such as lead, copper, phenols, DDT, etc,. some limiting concentrations already are established (Reference No.2). However, behavior of these substances in the estuarine environment and the effects of such minimal concentrations on estuarine ecology have not been determined. For example, what effect is there on productivity in an estuary, if the allowable DDT concentration produces partial sterility of the zooplankton population? Considerable research on such questions is needed. Similarly, the dispersal of toxic substances and the chemical cycles involving them in the estuarine environment need to be studied. For many substances we do not know what the toxic levels are, since many of these have been established for freshwater environments only. Similar quality standards need to be erected for organic substances, nutrients, etc. In freshwater bodies an excess of nutrients leads to accelerated eutrophication, but the processes of eutrophication in estuaries are poorly understood. We can be sure that it varies from system to system and is different significantly from freshwater processes. In some instances it appears that relatively high nutrient concentrations may be desirable. If it is found, for example, that the diatoms upon which optimum shrimp production in the salt marsh environment depends flourish under particularly high nutrient levels, good management of the shrimp breeding grounds would maintain such levels there. It might even be desirable to locate sewage outfalls in such regions for this purpose. At present the optimal quality standards for estuarine regions intended for different uses are poorly known.

Base line measurements and monitoring systems are required so that changes in quality characteristics of estuaries can be detected in time to provide effective management decisions. Monitoring networks need to be set up both in the estuaries and along their tributary streams. The properties monitored need to be designated as relevant to the optimum uses for which the estuarine region is maintained. South Carolina has not erected a monitoring system for our surface or estuarine waters that is adequate for this purpose. Surface water quality investigations should be continuous in this state for streams that flow into estuaries. The qualities measured should be those that provide the kind of data needed for estuarine management. Base line measurements would include surveys of the present distribution of plant and animal communities in our estuaries, surveys of the physical and chemical characteristics of our estuaries, and determinations of dispersal and exchange processes that govern the residence of particularly important pollutants in our estuarine waters. Few data of this type are available. Appropriate baseline measurements would also reveal the quantities of pollutants that are "reasonable" in terms of present South Carolina pollution laws. They would also provide the basis for detecting changes that are bound to occur in our relatively unpolluted estuaries with increasing urbanization and industrialization. Baseline measurements and monitoring systems provide practical information that can be used for management of estuarine resources.

The mixing and flushing characteristics of South Carolina estuaries should be studied. Since the tidal range along this coast is twice as great as the Virginia coast, for example, South Carolina estuaries might tolerate a larger load of certain pollutants than those in Virginia. We have almost no information of this kind. Suitable studies of the physical circulation of the continental shelf should be made, so that the limiting characteristics of the ocean reservoir could be determined. We have no information of this kind.

The natural assimilation capacity of an environment would be a useful guide in pollution abatement decisions, if it were known. Estuaries probably assimilate nutrients more effectively than lakes, but just how much more effectively is not clear. A program of fundamental studies on estuarine eutrophication and assimilation processes ought to be inaugurated.

In the field of population dynamics the short and long range responses of benthonic and planktonic communities to the stress of different kinds and levels of pollutants ought to be investigated. Studies of this kind should emphasize the processes and effects of the responses made to pollutants in natural environments.

Such fundamental studies of South Carolina estuaries and their dynamic characteristics would provide the kind of information required to interpret effectively the results of monitoring surveys. This would create a rational basis for estuarine management decisions, considering that each estuary has an optimum use as a public resource.

Finally, some remarks about the way in which the required management decisions should be made are in order. People and institutions at many different levels have a vested interest in estuaries. Each has a role to play in determining how they shall be managed and each has a responsibility to provide relevant information that is needed in order to develop equitable judgments. Policies for management of estuarine resources need inputs from industrial and community polluters; national, state, and local agencies with responsibility for wildlife, fisheries, recreation, commerce, etc.; private interest groups including conservation, sport fisheries, etc.; the scientific and technical community; and from government at various levels.

Industrial and community polluters should be responsible to monitor their own effluents and to provide information on their composition. They should support studies to determine the effects of their effluents on environments that they pollute.

State and regional agencies need to monitor the estuarine regions under their jurisdiction, support their own studies of baseline measurements, flushing characteristics, and pollution cycles, especially where these are relevant to particular local problems. They should establish locally relevant priorities for the uses of their estuaries. Local priorities and quality standards need to be consistent with national priorities and standards that reflect the public interest.

A national policy on estuarine management ought to be developed, so that these resources will be managed for the greatest public good. It is desirable to establish monitoring networks and a program of baseline measurements that have a common standard nationally. This would be done as an independent activity of a national agency or cooperatively between national and regional agencies. It is desirable to support fundamental studies of estuaries at the national level, because many of the results of such work will have general applicability. Such results will assist in developing a national policy for management of estuarine resources.

A program of public information ought to be established both nationally and regionally, so that the public will come to understand the relation between man and his environment. It is certainly clear that the problems of estuarine resource management are sufficiently complex that the appropriate decisions can be implemented only by an informed populace and through the active involvement of all levels of government.

Speaking for the University of South Carolina, I can say that we have been actively involved in problems of estuaries for several years. Our research workers have been investigating the effects of pollutants, the ecology, the physical and chemical properties, and the processes operating in estuaries both with our own resources and with those obtained from federal granting agencies. We are actively studying conservation questions, legal problems, and sociological implications of the estuarine region of this state. Our role is to conceptualize such problems, investigate them, and disseminate information both in formal instruction and through other established media. The University plans actively to continue to fulfill this role.

A question has been asked here -- I might anticipate it: How do we make these choices about the optimum use of an estuary and who makes them? Well, it seems to me the thing that is most important is that we do have a policy that estuarine resources ought to be managed. And this management ought to be a function of government at the national level, at the State level, and at the local level. And this is because there are local, State and national interests involved. These policies ought to be formulated employing industrial polluters and civic polluters and various interests of our recreational fisheries, agencies and so forth, and implements from science and technology.

It seems to me that there ought to be some national policies with respect to the management of estuarine resources regionally. It seems to me that one of the things that federal agencies should do is to develop and support specific programs of research on estuarine toxicity limits, cycles of pollution, ecological systems, and so forth, that have general applicability from one region to another. There is very little coordination of this kind of work in the present support of science structure.

It seems to me that state agencies should have their own programs of monitoring systems, for example. We ought to be monitoring exactly what is going on in Charleston Harbor and we ought to be monitoring the effluents that are going into the Savannah River and the Edisto and so forth. And we ought to be doing this on a State level, possibly even a local level.

It seems to me that the industries and the communities that provide effluents ought to be required to monitor their own specific effluents and, more than that, to characterize specifically its chemical and biochemical composition and make this information known or provide it to appropriate State or federal agencies so that we will have adequate data for understanding how much effluent actually is going into our estuarine regions as a basis for determining whether or not in any specific case we are exceeding the toxicity.

So I would say in this case of management there is a place for every organization in government.

MR. LINTON: Doctor Nelson, I would like to ask you a question in connection with the statement you made about monitoring. You may or may not know that Pollution Control Authority of South Carolina has maintained insofar as its ability would allow a monitoring system in those areas which we have, including this particular area here. The United States

Public Health Service and the Department of Interior cooperated in connection with the provision of a study for the Army Engineers which clearly indicated the pollutional characteristics of the Charleston Harbor. Could you give me some estimate of how many parameters in your estimation should be monitored on a continuous basis?

DOCTOR NELSON: Well, there are obviously a great number. And which parameters that you monitor in any specific estuary ought to be based upon what the optimum use or uses of that estuary should be. And if what you want in Charleston Harbor is a commercial harbor, that is safe for a large population here, then you ought to emphasize clearly the disease producing substances that might be in the water. You merely have to worry about the toxic pollutants, of which there are a great number. You certainly have to worry about the waste in the system.

MR. LINTON: I am extremely interested in what you have had to say by reason of the fact if you measure the efficiency of the State Pollution Control Authority, I would like to have this clearly indicated, because we do conduct over continuing periods of time, insofar as our limited ability will allow, these areas, including this particular area. I would be extremely interested in talking with you at a later date in connection with providing some funds for research in this area. As a matter of information to you, we cooperate with the Department of Interior's water quality monitoring mechanisms, which presently are being automated and which presently we are participating in the purchase of and they will operate them and give us the information prior to its being submitted to Washington for including in the reports of the conference. So we are doing insofar as we can everything that we can do on the monitoring basis. I would be extremely interested in your comments as to whether or not biological studies should be provided through some employment of people of your particular level and if so, if you are interested, we would be happy to talk to you.

DOCTOR NELSON: Thank you. Let me make one point very clear here: I haven't meant any criticism at all of any existing agency; because, as you point out, they are working right up to the present capabilities. This suggests that one of the things that we might do federally is to provide a program of matching support.

The other point I would like to emphasize is that in developing monitoring systems, it seems to me, these ought to be specifically oriented to provide the type of information that is relevant to a specific estuarine environment, in terms of goals for using that. So, this is a managerial thing.

As far as employing scientists and biologists in this sort of work, you know they will work on almost anything almost anywhere, and as a manager, it would seem to me we ought to be careful to provide the kind of money that will direct studies into areas that are really relative to problems that we want to solve and control.

MR. LeaMOND: May I ask Doctor Nelson a question?
My name is LeaMond, a member of the Delegation from Charleston County.

I wanted to ask if you were familiar with a report that was made by the U. S. Public Health Service a couple of years ago, after a very lengthy study of pollutants going into Charleston Harbor, at a cost on the order of $400,000? That report is available. I think it gives the answers to a lot of things you said should be done.

DOCTOR NELSON: I am sure this has been done for Charleston Harbor. I am familiar with the study although I haven't read the report in detail.

MR. LeaMOND: Then do you think studies should continue and continue and continue? One right now that has cost about a quarter of a million dollars is being done by the Corps of Engineers on the disposal of spoil.

DOCTOR NELSON: I think that the main problem in providing good management is to have the right kind of information to base decisions upon. But it seems to me if the manager -- and this is the political leader basically -- will specify the type of information he needs in order to get it effectively, then we ought to assure that studies specifically directed to those ought to go on. And we ought to have a continuing monitoring system in Charleston Harbor for those kinds of pollutants or effluents, or what have you, that are really giving us trouble here.

CHAIRMAN GARDNER: Our next statement will be given by Mr. Frank Young, who represents the Phillips Petroleum Company.

MR. FRANK YOUNG: I am Frank Young, Manager of the Phillips Petroleum Company Products at 966 Virginia Avenue in North Charleston, South Carolina. As the Phillips representative in this area, I would like to thank the South Carolina Water Resources Committee and the Federal Water Pollution Control Administration for their invitation to participate in this regional hearing.

In my statement today, I want to stress that the oil industry and Phillips Petroleum Company are active in the control of water pollution in all of the waters of this nation including those estuarine zones which are the subject of this meeting.

Phillips Petroleum Company has recognized its broad conservation responsibilities and has organized a special Company Water, Air and Land Conservation Committee. This committee is made up of executives from several of our major operation and service departments. The WALC Committee acts both as a policy formulating group and as the corporate instrument in seeing that progressive programs of pollution control are carried out in all areas where Phillips operates.

Actual implementation of pollution control planning is carried out by a professional staff of Chemical and Sanitary Engineers who make up the pollution control group in our corporate Engineering Department. This group, backed by the entire resources of an 800-man Engineering Department, is embarked on a two-fold program to both maintain efficient pollution control systems at existing plants and at the same time design modern effective pollution control systems for each new facility that is built.

My company and the oil industry in general finds much to gain from our pollution control efforts. After all, industry depends on the public for its livelihood. The public buys our products and in many cases invests in our stock. We believe that industry is sensitive to what the public wants, and it is obvious that the public wants a clean environment.

Phillips operates three product terminals on estuaries of the middle Atlantic region; one here in Charleston; one at Norfolk, Virginia; and another at Wilmington, North Carolina. Our terminals handle and store gasoline, kerosene and diesel fuel, and no waste effluents except rainwater are discharged from any of the terminals. A great deal of care was taken in the design of these facilities to avoid pollution from accidental spills. The truck loading docks are of a modern design using sloping concrete slabs with a center drain. All spilled material flows to the drain and is collected in a buried hydrocarbon tank. All rainwater falling in the loading area is routed through an oil-water separator for separation and recovery of hydrocarbon traces. As a safety factor, all of the product tanks are surrounded by a tank dike which contains all product spills. Rainwater falling within the dike is retained, and when all contaminants are skimmed from the surface, the clean water is drawn off manually through the valved outlet line.

Comparable care is taken in the design of tanker unloading facilities. Every effort was made to design the system so that there is a minimum chance for pollution of the waters.

One of the major pollution problems of the oil industry today is the prevention of accidental spillage of hydrocarbons from ocean-going tankers. Spills with very serious consequences have occurred in the last few years when tankers have run aground. Corrective measures have been proposed in Congress to help prevent the recurrence of such disasters. These remedial measures have the support and endorsement of the oil industry. A few other smaller spills, however, go relatively unnoticed each year, because of the effective clean-up efforts that are put into effect by oil industry groups. Phillips is participating in industry sponsored oil-spill cleanup groups at many locations, and we are a member of the group being formed here in Charleston. Because of the success of these area groups, we are actively encouraging the formation of similar groups at those operating locations where they are not yet organized.

While Phillips Petroleum Company does not have any major manufacturing installations located on East Coast estuaries, we do have major installations in other estuarine areas. Our largest Petrochemical Complex, Adams Terminal, is located on the Houston ship channel estuary, and our largest refinery is located in Martinez, California, on the San Francisco Bay estuary. Both of these facilities are served by secondary treatment facilities, and our key people at both locations are active in the affairs of local pollution control groups. We have several other installations in coastal waters which are not precisely defined as estuaries. Our recently completed drilling platforms in Cook Inlet, Alaska, and in the Pacific Ocean off Santa Barbara, California, contain every practical precaution to prevent pollution of the surrounding coastal waters. Our new petrochemical complex on the South Coast of Puerto Rico has a large central secondary treatment plant which provides biological treatment of all waste water streams.

One of the more difficult jobs for industry groups and government alike has been to establish water quality criteria for estuary water. Because of the tidal action and changing dilution rates, the problem is one that poses great difficulties.

The Water Subcommittee of the Engineering and Technical Research Committee of the American Petroleum Institute recently financed a study of estuary water quality criteria. Several prominent aquatic biologists were contracted to study the problem and present their views. As a result of this study, many different views were collected and estuary water quality criteria for the major coastal regions were formulated.

However, the study also pointed out that estuary criteria differ markedly from fresh water criteria, and that each estuary and each estuary region must be considered as a separate case.

We in the petroleum industry have developed information on estuary water quality criteria; yet, we cannot say that ours is the only acceptable criteria, for in a problem of this magnitude, there will always be honest differences of opinion. What is important is that industry and government alike do recognize a difficult and far-reaching problem in the potential pollution of the nation's estuaries, and that both industry and government do work together on a solution.

We at Phillips Petroleum Company most certainly agree with the position of Mr. T. A. Wastler of the Office of Estuarine Studies of the Federal Water Pollution Control Administration, as published in his paper, "Management of the National Estuarine Resource of the United States," when he said, "Our ultimate objective is to present to the people of the United States, an acceptable program which will give them maximum use of the estuarine resource with the minimum damage."

I hope that this hearing today will help us to come closer to that objective.

Thank you.

CHAIRMAN GARDNER: Next, I would like to call on Dr. A. W. Snell from Clemson University, with the Water Resources Research Institute.

DOCTOR SNELL: I am A. W. Snell.

We at Clemson University are happy to participate in these hearings and to express our interests as an educational and research institution in the pollution problems of estuarine areas. As a land-grant university, Clemson has a long-standing interest in the management and use of natural resources. Almost from our founding, the engineering and agricultural staffs at Clemson University have been working with problems of the utilization and/or conservation of natural resources.

Since 1960, the University has developed graduate programs leading to degrees in water resources engineering, environmental systems engineering and bioengineering which deal directly or indirectly with training researchers who may contribute toward solution of technical problems of pollution control in estuarine areas. In addition, graduate programs in economics and the biological sciences also offer areas of concentration in natural resources and ecology which bear on the broader policy questions involved in the comprehensive management of the estuaries and tidelands.

Since 1964, research activities dealing with man and his environment have been accelerated at Clemson by the creation of the Water Resources Research Institute. Some of the studies currently underway are specifically concerned with the engineering and economic aspects of pollution control. Studies are also underway at Clemson University examining the socio-economic impact of public management of natural resources and the market organization and structure of the South Carolina seafood industry.

The result of Clemson's educational and research activities in natural resource problems is that we have now assembled in South Carolina a competent staff of professional scientists with training and experience which can be brought to bear upon the problems of pollution in estuarine areas. We believe that basic information about natural estuarine processes and man's effect upon those processes is still so elementary and diffuse that additional research will be needed before a rational comprehensive management plan for estuarine resources can be developed.

One important phase is the economic and social aspects of estuary management in South Carolina. The 2,879 miles of tidal shoreline and the 427,900 acres of estuary water surface and adjacent tidal areas and marshlands of South Carolina constitute a productive natural resource of considerable actual and potential economic value. The general public, however, is only beginning to become aware of these potential values. Except for a comparatively few hunters, fishermen, and nature-loving conservationists, tidal marshes and meandering estuaries have, throughout much of the history of South Carolina, been considered to be liabilities instead of assets. Article I of the Amendments to the State Constitution requires the General Assembly to write a law which will provide for the condemnation of all lands necessary for the proper drainage of the swampy and low lands of the State, and in 1911 the General Assembly made the following policy statement:

> It is hereby declared that the drainage of swamps ... and the reclamation of tidal marshes shall be considered a public benefit and conducive to the public health, convenience, utility and welfare. (1962 Code of S. C. Law, Sect. 8-201.)

Pursuant to this policy, public officials have until quite recently encouraged and promoted dredging estuaries to straighten and deepen them in the interests of navigation, and the dumping of the spoil on tidal marshlands in order to "reclaim" them for developmental purposes.

From an economic standpoint, however, the estuaries and estuarine zones are a productive resource subject to many possible uses -- commercial navigation, swimming, boating, sport-fishing, commercial fisheries production, and even the dilution and biochemical purification of waste products. Although some of these uses may take place concurrently in any given estuary, some of them, by their very nature, are mutually exclusive. Thus one may think of the problem of estuary management as essentially that of allocating a scarce and productive resource among many possible competing uses or groups of uses. However, the services and satisfactions received from many estuary uses are not subject to sale in the marketplace. Moreover, in the case of estuary-based economic activities, it is possible to reap what one has now sown or to sow but never reap. That is, even in the cases where estuary management does produce a marketable product, the returns to wise, conservation-centered management may not necessarily accrue to the one who practices such management. As a result, many important decisions about estuary management must be reached by political rather than market processes. If, however, the allocation of our estuary resources among the many possible uses is to follow sound principles of management, research must be undertaken by natural resource economists to determine the direct and indirect effects upon income of each of the alternative uses of the estuarine zone, and the economic benefits and costs of various activities and developments which pollute estuarine waters or otherwise change the quality of the estuarine environment.

The growth of urban areas, the pressure for water front residential sites, the need for continuous dredging of navigation channels, and the increase in industrial and domestic wastes are reducing the estuarine areas available for commercial fisheries production. Some of these uses of the estuarine zone are undoubtedly socially and economically necessary. However, we need to evaluate carefully the income potential we are losing when we commit the estuaries and marshlands to uses which preclude commercial fisheries production.

Natural resource economists at Clemson University have worked for several years with problems of determining the direct and indirect effects upon income of alternative management plans for river basins and other water-related resources. In the course of this work, it has become apparent that the study of the total problem of river basin management must include an analysis of the economic effects of changes in the quality and quantity of fresh water moving into the stream's estuary. Land use practices in the Piedmont, for example, may have and have had very serious and damaging effects in the tidal areas of South Carolina. Problems of pollution in the estuaries may have their origins in industrial or municipal activities upstream many miles from the coast. Although Clemson University's research interests in economic aspects of water resources management were first directed toward the river basins and sub-basins of the interior, we have gradually come to realize the close relationships between the use and management of the drainage basins of fresh-water streams and the problems of the estuarine environment.

Another important phase is the biological aspect of estuarine pollution. We are interested in this problem area as it relates to the total academic and research program and to a proposed graduate program in Marine Biology. A major biological problem is the destruction of habitats and breeding grounds for important species of marine organisms by spoil resulting from dredging operations necessary to keep the harbors open.

These spoil areas may also serve as a reservoir of hepatitis virus and as a breeding place for mosquitoes. Such effects need to be evaluated.

Acceleration of eutrophication of estuaries by municipal, industrial, and agricultural operations must be ascertained as well as the more obvions pollution effects. Increased BOD levels leave much of the bottom areas anaerobic during periods of highest biological activity. It is thought that several large fish kills have been the result of discharging industrial effluents into estuaries. Shellfish production in some areas has been seriously curtailed by bacterial pollution from municipal waste. There is spectulation that pesticide residues are present in estuaries and that some significant effects have been noted. It has been observed that the ecology of estuarine lands has been completely altered by the construction of causeways and bridges in these areas. These problem areas also need to be evaluated.

The input data required for research in estuary management must be supplied through the cooperative efforts of engineers, biologists, and economists. The availability of data from engineering and biological studies for purposes of planning and estuary management should not be merely coincidental, but it should be a planned objective incorporated into the research design through interdisciplinary consultation.

Pursuant to the Federal Water Resources Research Act of 1964 and parallel action by the State government, the Water Resources Research Institute at Clemson University has official responsibilities and offers its resources for coordinating water-related research in various disciplines and institutions in South Carolina. We urge that all agencies and groups involved in the study of the pollution problems of estuaries and estuarine zones take cognizance of the need to coordinate research efforts and develop technical information consistent with the need for comprehensive management studies of the estuaries as a productive and valuable economic resource of South Carolina and the nation. We are hopeful that these hearings will result in broader interest in and support for systematic research in problems of estuary management.

Thank you.

MR. LeaMOND: Question, Mr. Chairman.

My name is LeaMond, as I mentioned before.

Can you tell us what Clemson has done so far in research in water pollution?

DOCTOR SNELL: Specifically, estuaries?

MR. LeaMOND: Yes.

DOCTOR SNELL: The research so far has been directed to fresh water as far as pollution. There have been a limited amount of economic studies involving the use of these. But most of the work has been laboratory processes and so forth that certainly has an indirect effect on estuaries. The capabilities are limited. It is desirable, of course, to extend its work into the estuaries. But with limited resources that is where we are, sir.

MR. LeaMOND: Thank you, sir.

MR. JENSEN: You have said that we need to have much additional research before a rational management plan can be developed. What would you suggest we might do during this period? It might be a long period, in which research is going on. Do we do nothing or do we declare a total moratorium on, say, filling in the estuarine areas? Do you have any thoughts at all on what can happen during this interim period?

DOCTOR SNELL: First of all, I would say research is a continuing process. Equally important decisions are made which are continuing. No, sir, we cannot wait. Decisions must be made today, with the available knowledge that we have, and I think we are gaining. But personally, I think, as far as estuarine areas, they have been neglected as far as conservation is concerned.

MR. JENSEN: Do you see a need for any additional estuarine facilities in the State?

DOCTOR SNELL: Yes, sir. We feel very strongly at Clemson University that facilities are needed so that research can be done in the estuarine areas.

CHAIRMAN GARDNER: I think this will probably be a very good time for the break for lunch. I understand that the places here a few minutes after twelve become fairly well crowded. We will break now and reconvene promptly at 1:15.

MR. LeaMOND: Mr. Chairman, may I ask one final question?

Will someone tell me if nothing is done in the Charleston estuarine area in regard to industrial pollution, how long will it take the Federal Government to step in?

CHAIRMAN GARDNER: A very good question.

MR. JENSEN: I defer to the Regional Office.

MR. LeaMOND: What was your answer? I didn't hear it.

CHARIMAN GARDNER: Mr. Jensen said he deferred to the Regional Office, meaning me. That is a question that would be very difficult to answer at this time. With the present development of the standards and so forth, many of which have not been approved, it would probably be some time beyond this.

MR. LeaMOND: Thank you.

(Thereupon, at twelve, noon, a recess was taken.)

AFTER RECESS

(The meeting was reconvened at 1:30 p.m.)

CHAIRMAN GARDNER: I will call on Mr. I. M. Bryan, South Carolina Wildlife Federation, to lead off the afternoon.

(No response.)

CHAIRMAN GARDNER: We will call Mr. Bryan a little later.

Mr. Gordon Howard, Clemson University.

MR. GORDON HOWARD: Mr. Chairman: The faculty of the Department of Recreation and Park Administration of Clemson University wish to express their concern for the optimum use of South Carolina's resources, in particular, its estuarine resources.

South Carolina is engaged in a program of economic development that calls for attracting both industries and tourists to the State. Under certain conditions, industry is not compatible with tourism. Legislation must be passed to completely prohibit the dumping of industrial, municipal, and private wastes, treated or untreated, into the estuaries and their tributaries. Legislation concerning air and noise pollution controls should also be considered.

Land adjacent to the estuaries is valuable recreation land. The State, counties and municipalities should be encouraged to and aided in the purchase of this land for recreational purposes. Industries and municipal facilities which are unsightly or cause air, noise or water pollution should be discouraged from being constructed along the shoreline.

The development and use of each estuary and seashore area should be under the supervision of a development board composed of competent economists, businessmen, recreation planners, conservationists, and representatives from the State, county, and municipal governments.

Each area should be evaluated according to the following priority system:

First Priority:	Conservation - Areas valuable in the primitive and undeveloped state for the conservation of natural habitats and wildlife, for preservative, scientific, and occasional recreative purposes.
Second Priority:	Recreation - Group A - Areas best left in a primitive state for recreational uses. Group B - Areas best suited for low density use for recreation purposes. Group C - Lands best suited for high density use for recreational purposes.
Third Priority:	Residental - Group A - Areas best suited for low density, single family residences. Group B - Areas suitable for high density multiple family residences.
Fourth Priority:	Commercial - Group A - Areas best suited for businesses concerned with water recreation and associated activities.

Group B - Areas best suited for business concerned with other than water front recreational activities.

Fifth Priority: Industrial -

Group A - Areas suitable for industries that produce no air, noise and water pollution.

Group B - Areas suitable for industries that produce small amounts of air and noise pollution.

Areas as stated above should be defined to include shoreline and adjacent land, the water surface and subsurface and the land under the water.

The water surface, subsurface and the land under the water should remain in the public domain and undeveloped except for minimal development for docks, swimming areas and restaurants in commercial areas (Group A classification), in high density recreation areas (Group C classification) and in residential areas (Group A and B classification). All installations on this public domain would conform to the codes established by the development board.

Without this program or one of a similar nature, development of the estuaries and seashore will not yield optimum use of all areas and will probably not be in the best interest of the people of South Carolina.

Thank you.

Any questions?

MR. LINTON: Yes. Mr. Howard, I don't think that I disagree too far with some of the statements you made. However, I would reserve the right to disagree with the order in which you named them.

Let me ask you, in connection with the statement that you made, are you not actually indicating a need for zoning? Isn't this in essence what you are saying?

MR. HOWARD: Not in the sense that I would normally consider zoning. I would say that you would take each area and as it is evaluated you would evaluate it starting first with conservation, then recreation, then commercial, then industrial. In other words, you would look at it and say, Is this a valuable land, of exceptional value as a piece that should be conserved for residential purposes, or what have you.

MR. LINTON: But this would be tantamount to zoning, according to my interpretation. If we disagree, let's have a meeting of the minds here. It seems to me that all of our programs, including all of the items you have listed, are subject to somebody's determination. Now I get to Mr. Jensen's question, if this is a valid statement that I am making, then who goes about doing this?

MR. HOWARD: Doing what?

MR. LINTON: Making the determination as to what areas should be oriented for recreation, conservation, residential, agriculture.

MR. HOWARD: This was put forth in what I call the development board, which was made up of business people, recreation planners, and authorities from State, local government.

MR. LINTON: At what level would you suggest that this control agency be formed?

MR. HOWARD: I feel that this would probably best be formed at the State level.

MR. LINTON: Thank you, sir.

MR. JENSEN: What department of the University are you in? Planning?

MR. HOWARD: Recreation Department and Park Administration. Recreation and planners.

CHAIRMAN GARDNER: I would like to call on Dr. Calden Battey, from Beaufort, South Carolina.

DR. CALDEN R. BATTEY: I am Dr. Calden Battey of Beaufort, South Carolina, retired physician, and have been living there for fifteen years and visiting there for fifty years every summer.

I have come here to discuss why in Beaufort we have no shrimp and no fish. I have been fishing here for fifty years and it has been pretty good fishing until the last month.

In order to acquaint you with the situation, I will read a letter that I wrote to Major Daniel Sagramoso at the time that the Tenneco Chemical Dye plant applied for a permit.

"Dear Major Sagramoso:

> Concerning the proposed location of a dye plant to be built by the Tenneco Company, we feel that a complete knowledge of this industry, and specific plans for this plant, should be made known to the public before any approval of this project. A guarantee should be given that it will not destroy our marine life or make our Beaufort waters so undesirable that the fish, shrimp and crabs, although not killed in some locations, will leave and avoid our contaminated waters.
>
> "Let us first discuss Tenneco's plans as we understand them. We quote from a letter written to Mr. Ralph Horton, of the State

Development Board, by Mr. Frank Card, Director of Marketing for the Tenneco Company. This letter describes plans for three expansions. The initial plant is expected to dump into the upper reaches of the Coosaw River 16,000 gallons per day of untreated effluent or 'discharge.' It is said that this will contain the equivalent of 1,000 gallons of 100% sulfuric acid. No mention is made of the form in which this acid will be present, or the many other constituents. These will naturally include many other chemicals, including the residues from the many dyes manufactured. Many dyes and dye intermediates are highly toxic and can be much more dangerous to marine life that the sulfuric acid mentioned.

"The next expansion is expected to dump 35,000 gallons per day of untreated effluent with a total 100% sulfuric acid equivalent of 1,500 gallons, and increased quantities of the unknown constituents.

"The next planned expansion will increase the volume of untreated effluent to 75,000 gallons per day with a 100% sulfuric acid equivalent of 2,000 gallons, and further increases in the other objectionable residues.

"Concerning the 'third' expansion, we quote from the letter as follows:

> 'Regarding the chemical constitution of the effluent we can be quite specific for the initial plant, but much less so for the future since we do not know precisely what we will want to produce at that time.'

"In other words, we do not know what to expect after the second expansion. On the third expansion, they say that they do not know what their untreated effluent will contain. What kind of guarantee is this?

"Dr. A. P. Hewlett, an eminent chemist and former Vice President of Esso Research and Engineering Company, who now lives in Beaufort County feels that there is great potential danger to our waterways and marine life from untreated chemical and other industrial wastes. He feels that there should be complete specific knowledge of the chemicals and dye residues to be included in the proposed untreated effluent. Such would permit a better evaluation of the hazards of this proposal with reference to our waterways, our seafood industry and the attractiveness f this entire area as a place to live, to build retirement houses and to visit as tourists.

"Next, the proposed location. The present proposal covers a location at the headwater of the Coosaw River. This would require the untreated effluent to flow down the entire length of this river, some twenty miles. Besides, a portion of this untreated effluent would pass through Whale Branch into Broad River. Another portion would find its way through Brick Yard Creek into the Beaufort River. Thus the untreated effluent would flow through all of our major rivers.

"Other locations, such as the lower portion of Lands End or Bay Point would restrict the flow to a very short distance before reaching the ocean.

"Our request is that this effluent be treated and rendered harmless before discharging it into our waterways.

"Thanking you for any way that you can aid us in this matter."

Since this letter was written, I understand that their domestic waste -- that includes their sewage -- is treated to make it free of any bacteria. Biologically pure, yes. But those chemicals used to treat this human sewage and their waste is then combined with their untreated effluent and dumped into our river every 24 hours.

Now, that is one letter. I don't want to bore you folks. I have a lot more. I will be glad to read them. But that is the gist of one letter. I will be glad to submit them to you.

MR. LINTON: Mr. Chairman, I hadn't expected to be confronted with this particular item.

However, for the information of Doctor Battey, public hearings were held in connection with this particular installation in Beaufort in company with all of the people who had an interest, including Doctor Battey. I don't know whether you were there or not.

DOCTOR BATTEY: I was there; yes, sir.

MR. LINTON: The situation now in connection with this particular installation has been brought to my attention and I have issued instructions to my assistant to have this matter investigated. The fact of the business, my wife and I several weeks ago investigated this one Saturday morning, and what we saw led me to the position that something was going to have to be done other than what presently is being done.

So, Doctor Battey, for what this is worth, this particular problem is under investigation at its present level. I am not sure I am satisfied with what is being done now and I assure you that when expansions become a matter of fact, either to the 50,000 gallons or the 75,000 gallons which you mentioned, that that increase would have to be reviewed by the Pollution Control Authority of the State of South Carolina before this could be done.

Now, in connection with your proposal that the waste be treated to such a point as not to interfere with the marine life, you may rest assured that investigations are under way to make these determinations. I have instructed both the Pollution Control Authority people and the people who are associated with the shellfish industry in Beaufort County and otherwise to investigate these conditions and if the contributory cause to the demise of the fish you referred to is attributable to this plant, action will be taken.

DOCTOR BATTEY: Could I add one thing? Couldn't their human waste and sewage be put in a septic tank, rather than to dump it and let it go out?

MR. LINTON: We are trying every possible way we can to eliminate the construction of septic tanks. And Beaufort is on our list.

DOCTOR BATTEY: Is the phosphate plant in operation up on the Broad? I say, is it in operation? I would like to know.

MR. LINTON: On what river?

DOCTOR BATTEY: It is on Broad River. Right above Beaufort. Right on the road to Savannah. I was told it was in operation.

MR. LINTON: Mr. McCormack is in charge of the shellfish patrol of the State of South Carolina, Health Department, and he knows of no operation of this kind.

In connection with this, Doctor Battey, the question that was asked this morning as to the availability or the practicability of utilizing 320,000 acres for the mining of phosphates would, I think, be an error in judgment. The associated pollutional characteristics both of water and air, in the mining and assimilation and mixing of the phosphate for fertilizer, is a matter of extreme interest and concern over the entire eastern seaboard.

DOCTOR BATTEY: They have the same operation of phosphate in Florida. I will be glad to read what they say. In the Peace (?) River every fish has been destroyed.

MR. LINTON: I am positive that this is the case. And just a very few days ago we had a meeting in Columbia with the delegation of one of the lowcountry counties in which reference was made why could not we in South Carolina do in air pollution control what the State of Florida has done. And I might add in connection with that question, I might reply to it by simply saying that South Carolina is going to have to do more that Florida has done if there is a utilization of 325,000 acres of land for phosphate mining.

DOCTOR BATTEY: One other thing. I have been called by people who live near the highway, near the plant, and they have called me and asked me to come out and see wash-tubs of crabs and shrimp that are floating in the vicinity from discharge pipes.

MR. LINTON: If this is the case, rectification is in order and we will certainly see that remedial measures are installed.

DOCTOR LUNZ: Mr. Chairman, I would like to offer to Doctor Battey and Mr. Linton the information we have as it appears from our laboratory.

You have heard this morning how neglected are marine fisheries in South Carolina. But, surprisingly, the last few years, the fact this discharge was coming in that area, we have regularly once a month made surveys of the relative abundance of all species of marine fish, crabs and shrimp on both sides of this discharge. Don't embarrass me and ask me what they look like today. I have been too confined to look at them. But that information is there, it is available, and I think will be very valuable in proving one side or the other.

DOCTOR BATTEY: Do you want me to collect specimens of crab and fish that are dead?

DOCTOR LUNZ: Doctor, thank you, sir. We are doing that. We have for three years now monitored the crabs and tested the pesticides and everything in them we were capable of doing.

DOCTOR BATTEY: Don't you find that the shrimp are greatly diminished?

DOCTOR LUNZ: Absolutely.

DOCTOR BATTEY: This is the first year in fifty years. I have been coming here for years.

DOCTOR LUNZ: I am not insisting or even suggesting that the downfall of shrimp and crabs in Beaufort County is due to this one thing. It extends from North Carolina down into Georgia. But I think the upset of the estuary has a very important part in this decline of fishing.

MR. LINTON: Mr. Chairman, I would like to thank Doctor Lunz for the latter part of his statement. I am of this opinion also. I would not here enunciate that there is an impossibility of the demise being associated indirectly or directly with this particular enterprise. But I do feel that there are other influences way out beyond this particular contribution.

CHAIRMAN GARDNER: For the next statement, I call upon Mr. R. M. Hendricks, West Virginia Pulp and Paper Company.

MR. RALPH M. HENDRICKS: Mr. Chairman, ladies and gentlemen: My name is Ralph Hendricks and I am with West Virginia Pulp and Paper Company here in Charleston. Our statement here today was to be presented by Dr. Daniel O. Adams, who is manager of our Technical Services Department. He was called out of town unexpectedly and I will now give that statement.

Our company is vitally concerned, of course, in the estuaries of South Carolina. We are pleased that you have invited us to be here today to express our viewpoint on this important aspect of South Carolina's resources.

Westvaco in Charleston currently employs 1,800 persons directly in our mill and through pulpwood and material purchases, an estimated additional 400 persons are gainfully employed. The mill contributes $55,000,000 per year to the economy of the state through payroll and purchases and pays state and local taxes of $1,000,000 and federal taxes of $4,000,000.

The Charleston estuary presently has many uses. These include port and harbor facilities, industrial activity, recreation, fishing, and support of wildlife. We, at West Virginia Pulp and Paper Company, subscribe to this multiple use of estuaries.

There can be no disagreement regarding the great value of these uses to the people of South Carolina. They are important to all segments of society. A most important goal, therefore, should be to develop a management plan for each estuary which would provide the proper balance between the multiple uses of that estuary. It is only in this way that the full benefits and value of an estuary can be realized. To emphasize any one use while ignoring or unduly penalizing other legitimate uses is not in the best interest of the people.

Over the past several years, Westvaco has undertaken extensive studies of the Cooper River portion of the estuary. We have sought scientific answers as the basis on which we can apply sound management principles. We believe our work is valid and has given us some insight into the complexities of the estuary. From our work and experience we believe it has been demonstrated that waters of the estuaries of South Carolina are presently adequately protected by stream classification standards established by the South Carolina Pollution Control Authority. We believe the standards represent sound application of the best knowledge available on estuary management. We recommend no changes in these standards at this time. We should, however, like to express our support for further scientific research of our estuaries. It seems evident to us that a study period extending over several years will be required before realistic goals for the far-sighted management of the estuaries can be established.

The Cooper River supports abundant fish life and at times the news media recommend it as the best place for fishing in the Charleston area. There is, however, insufficient information concerning the response of fish and other estuarine life to various environmental stresses, both natural and man-made.

As an example, there is evidence that dredging of ship channels has a marked effect on the ecology of the area. Bottom scouring by propellor turbulence is another factor which must be taken into account.

All communities along the Charleston estuary are presently taking steps to provide adequate treatment of their sanitary wastes. We plan to collect all such wastes arising within our mill and will transport these to the North Charleston Public Service Commission for treatment. Through these programs, the estuary, and the recreational activities it provides, will be protected from high concentrations of disease-causing bacteria.

In other words, the programs and standards developed and being developed cooperatively by municipalities, industry, and the State of South Carolina will adequately protect the estuary for the multiple uses for which it is suited. At the same time they will not inflict undue penalties on any group or individual and will allow for the full enjoyment and proper use of the estuary by all interests.

Finally, we would like to emphasize our company's dedication to resource management and the importance we place upon this subject. We are part of an industry which must conserve natural resources in order to exist. We have been in the past and are now leaders in conservation and management of forests for multiple uses. We believe the same principles can be applied to estuary management. For this to be possible, however, estuarine management must be based on scientifically supportable facts.

Mr. Chairman, I regret very much I am not as capable as Doctor Adams of answering any technical questions but I will be very happy to try to answer any questions you gentlemen might have.

MR. LINTON: Could I ask Mr. Hendricks a question?

In the absence of Doctor Adams, Mr. Hendricks, would you, insofar as you can, indicate what your company is doing leading to the possibility of treatment of the wastes, the industrial wastes from your company?

MR. HENDRICKS: Right. We have approached this in two different fashions. One is a nearly half-million-dollar collection system, which is described in this statement as handling our sanitary waste problem. We have decided, after considerable expenditure, to study the problem of industrial waste. We have made the decision to head in the direction of handling engineering and establishing our own waste treatment facilities for our industrial waste problem at the site. And will probably ultimately install facilities on our property there.

CHAIRMAN GARDNER: Mr. Thomas Thornhill has indicated he has to leave very shortly and would like to give us some insight into current programs now in the Charleston area currently underway.

MR. THORNHILL: Thank you, Mr. Chairman.

I was leaving and so I passed this note to Mr. Guess and he thought that I should read it into the record. I thought someone else would probably make this statement here this morning so I did not include it in my remarks. But I think since we don't know exactly where the public record of this hearing will go that it ought to be recorded here, that the Charleston area has taken a good number of steps to clean up its pollution.

The gentlemen referred to local programs and what people were doing about it, and I thing that this should at least be part of the record: that there is some forty million dollars currently being spent in this area by thirteen communities and military establishments to treat sewage prior to the legislative cut-off date of dumping into the rivers and harbors of Charleston, the cut-off date being July 1, 1970. The industry's action, as just stated in the remarks by West Virginia Pulp and Paper Company of this area, has also been seeking to meet the standards for stream purity as set by the South Carolina Pollution Control Authority. In addition, the Department of Engineers intend to spend forty million dollars to reduce the silt pollution in this area. And since much of this hearing has been on studies and monitoring, any of this process done in estuaries of Charleston area must by necessity be programmed around the July 1, 1970 date. And then such studies can tell you what additional treatment is necessary over and above the primary treatment now required by the South Carolina law.

CHAIRMAN GARDNER: Has Mr. I. M. Bryan returned?

Our next statement will be given by Colonel Robert Rich, the District Engineer here for the Charleston District, Corps of Engineers.

COLONEL ROBERT E. RICH: Thank you.

Ladies and gentlemen: I appreciate the opportunity to present the interests, activities and recommendations of the Charleston District, Corps of Engineers as they relate to the objectives of the Clean Water Restoration Act of 1966 and to the estuarine areas of the State of South Carolina. The Corps is vitally interested in the estuaries and estuarine areas of the state, and actively supports the optimum development and use of this valuable resource. We are keenly aware of the important role of the estuarine environment in sustaining marine life and providing proper habitat for other wildlife forms, and the necessity for preservation of ecological balances to the greatest possible extent consistent with other resource development requirements.

Perhaps it would be well at this point to state briefly the role of the Federal Government, administered by the Corps of Engineers, in the development and maintenance of water resource projects. (Corps projects which, by their very nature, affect, and are affected by estuarine zones are flood control and drainage projects, shore protection works, and, to a greater degree, navigation projects.) Upon request from local interests for the provision of such a facility and upon the prosecution of studies demonstrating the engineering and economic feasibility of a plan of improvement, the Federal Government will assist local interests in providing the requested and needed facility -- they being unable to provide it within their own resources.

In the provision of this Federal assistance, certain items of local cooperation are required. Among these is the requirement that local interests provide lands, easements, rights-of-way, borrow areas, etc., necessary for project development; and, in the case of navigation projects, provide adequate and suitable spoil disposal areas for initial construction and subsequent maintenance.

The Charleston District is administering a positive and continuing program in the interest of clean water. Particular attention in this regard is given to established and proposed projects and activities in the state's estuarine areas.

Existing Projects. Major navigation projects in coastal South Carolina are: Georgetown Harbor, 27-foot project; Charleston Harbor, 35-foot project; Port Royal Harbor, near Beaufort, 24- and 27-foot projects; and the Atlantic Intracoastal Waterway, 210 miles from Little River to Port Royal Sound, 12-foot project.

Prior to about 1953 most, if not all, in-harbor maintenance dredge spoil was deposited in open-water areas and undiked marsh areas within the harbors. Commencing about that time, in the interest of prevention of dredge spoil dispersal, emphasis was placed on discontinuing open-water spoiling and the placement of spoil material behind dikes. This emphasis continues to the present, as funds and availability of spoil disposal areas permit. Recent disposal area acquisition has been made for Georgetown and Charleston Harbors and the areas are currently under development. All dredge spoil within the harbors is currently being confined by dikes, with the exception of a minor shoal in Georgetown Harbor.

In the case of Charleston Harbor, mitigation of the shoaling and maintenance problem will result from construction of the proposed rediversion plan. Moreover, a comprehensive study is being prosecuted to determine possible alternative methods of spoil disposal. Favorable findings from this study would further ameliorate any pollution problems associated with maintenance dredging.

Prior to this year, diking of disposal areas along the Intracoastal Waterway has been fragmentary. However, repetitive use of several of these areas over the years has reduced their capacity to retain deposited spoil. Consequently, a contract was awarded this year for diking of a number of these key areas. Further, the local sponsor has been requested to provide additional area to facilitate a proper future diking and disposal program.

All work bearing upon the operation and maintenance of existing projects in the state's estuarine zones is coordinated with Federal and state agencies having pollution and fish and wildlife responsibilities.

Proposed Projects. All studies leading to plan formulation and recommendations for water resource development projects are being fully coordinated with all appropriate Federal, state, and local agencies to ensure, among other purposes, that adequate emphasis is given to abatement of estuarine pollution.

Other Activities. All applications to the Corps of Engineers by public and private interests for permits to construct facilities to navigable waters are fully coordinated with Federal and state agencies having pollution control responsibilities.

All District-owned floating plant is equipped with acceptable waste treatment facilities; and as soon as appropriate Federal standards are developed, it is anticipated that treatment facilities will be required for all Corps-owned major floating plant and contractor-owned major floating plant performing work for the Corps of Engineers. Further, the District discharges a continuing responsibility for investigation, reporting, and treatment of spillage of oil and other hazardous materials in navigable waters.

The South Carolina Water Resources Committee has established a task force to study the tidelands and coastal waters of the state. The task force is comprised of Federal, state, and local governmental interests, and the Charleston District, Corps of Engineers, is cooperating with the state in this endeavor. The objective of the task force is to coordinate a study leading to specific recommendations to the Governor for the optimum development and use of the tidelands and coastal waters of South Carolina. A member of my staff is on the Task Force Steering Committee and the Navigational Facilities Subcommittee. It is my impression that the formation of this study group is a very significant step forward in the state's effort to delineate proper utilization and control of its tidelands, and that the ultimate findings may well result in recommendations for zoning of areas for a specific use, particularly in areas where industry and commerce are dominant factors.

Thank you for your attention, and let me assure you that the Corps will continue to work for the prudent development of the water and related land resources of South Carolina as well as the abatement of pollution in all its forms.

MR. JENSEN: Colonel, just to complete the record, could you give us the schedule for the reports of the Task Force?

COLONEL RICH: I would prefer that that would come from the organization of the state, which would be Mr. Guess. We are a member of this particular committee and we will respond to their guidance.

Thank you.

CHAIRMAN GARDNER: Thank you, Colonel Rich.

Our next speaker, Mr. James Smith from Hanahan, South Carolina.

MR. JAMES T. SMITH. Thank you.

I am James T. Smith from the little community of Hanahan, just a hoot and a holler up the road. It is my endeavor to attempt to represent the little folks. I think Mr. Linton and Colonel Rich are familiar with my basic ideology of the water situation. A lady this morning has opened the door on something and I would appreciate stepping in. The implication is this develops into a Democratic situation. I had about fifteen years ago or better attempted to bring matters of this pollution situation to the front with various and sundry people and it seems to have fallen on deaf ears. And maybe with a return to a Republic form of government we may be able to endeavor to achieve some of these difficulties.

It is my desire to see the waters of America left in as pure a state as possible. These waters are public domain belonging to every American and are not for contamination, pollution or destruction, desecration or blocking by any individual, industry or community.

Mankind is mankind's own worst enemy. Mankind with malice, avarice and greed (not necessarily always for money) or ignorance has destroyed many of the wonders of nature. Mankind has destroyed, has made extinct many creatures that once roamed this earth, by greed or by ignorance. Mankind, time after time, has upset the balance of nature to his own grief. Mankind for his own personal gain or comfort has en masse destroyed creatures of this earth.

There have been numerous reports of mass fish kills in the area of the Charleston metropolis. Time after time there has been reported fish kills in the rivers and harbor. A number of these have been attributed to industrial waste and pollution. There have been fish, minnow and shrimp larval killed in estuarine area of nearby island areas. The blame of this has been laid to insecticide poisoning.

For years mankind has polluted streams and harbors of this vicinity with sewage and industrial wastes and chemicals. I understand, due to heavy contamination, if immediate complete pollution control was achieved it would take ten years or better for nature to purify the harbor waters. This pollution factor has placed shellfish in the area off-limits for human consumption. This condition has also placed swimming off limits.

Due to the propagation habit of our marine creatures, the treatment of our estuarine marsh resources is of vital importance. Fish, shrimp and crabs coming into these protected backwater areas to sire young may have themselves and their young exterminated by primary or secondary means. That is, by direct chemical insecticide spraying of the marshes for mosquitoes or by the spraying of land and foliage areas and the chemical washed into the marshes by rain.

Another excellent means of extermination is by means of eliminating the breeding and nursery grounds. This is primarily accomplished by filling the marsh. This is done by three basic procedures; one being the dredging of silt for the purpose of channel depth for ship passage, and the most economical spot is a convenient marsh area. Another and similar situation is general dredging to fill marsh areas for reclamation purposes for financial gain through structural endeavors for businesses or homes. One drawback on this seems to be a chemical change in the soil that causes vegetation to cease to grow. A third procedure is the landfill process, utilizing garbage, trash and other materials and giving it an earth covering. It is my understanding the above-listed chemical reaction also takes place here and after a number of years the harmful gases or chemicals work to the surface and destroy vegetation. An unsuspecting homeowner may wonder why his bushes, flowers and grass are suddenly dying out. One such endeavor is now taking place at the Highway 7 bridge crossing the Ashley River. Those who have come across that have no doubt noticed the work being done there right now.

For many years there had been a seafood industry in the Charleston area catering predominately to the crab industry. For the last few years the industry has been suffering a continuous decline in the crab harvest. The business is now closed. The great Democrat Congress and the bureaucrats saw fit to impose a wage and hour law onto this industry rather than permit it to operate on a production pay basis. Thus, this is the straw that broke the camel's back. Rather than help the people working there, it cost them their jobs as well as finished the destruction of a business that man had started destroying by various forms of pollution and destruction of nursery grounds.

I have read reports that the Carolina Coast is about the only shellfish territory left in the country. If this is fact, we had better be cleaning our waters and protecting them or another industry and another species of creature will have departed this earth.

This is a strong indictment against mankind but mankind has created his own record and therefore must stand upon it. Bureaucracy has also created its record, a record of rule, control or destroy.

To correct these conditions mankind must go about this task in a wise manner, in a manner of benefit to mankind and to nature and without the lust of power to rule and the greed of a few. Mankind must utilize rules of flexibility; not rigid rules, but guidelines to vary for conditions and as man attains additional knowledge.

Safer insecticides will need to be developed. Other means of pest control will need to be explored, such as using nature. Some communities are utilizing birds to keep down mosquito problems. Other means may be available such as using electronic devices.

As for other forms of pollution, man may utilize settlement basins, filtering systems or other devices for controlling chemicals, wastes and other pollutants that may attempt entry into our streams, rivers and bays.

As for the matter of filling marsh areas, this should have some controls. For the elimination of dredge waste material from harbor and channel deepening, a more appropriate means should be employed. There may be an increased initial cost but appropriate plans could bring the cost back down. Besides, would not the increased cost be worth the saving of our resources? One possible means of accomplishment would be to lay a line out to sea and pump the waste in an area outside the sea lanes and away from known fishing drops and shrimping areas. And in talking with a distinguished gentleman during the noon break, I have been initiated to another idea -- of the possibility of utilizing some fresh-water marshes and pumping this material in and diking it in and creating some fresh water breeding grounds, raising of various and sundry fresh water fish, which is another excellent possibility.

As for marsh fill for use as real estate, this should be done only in rare instances, in the interest of the general public.

If the science develops to the stage of feasibility for the utilization of estuarine resources for generation of electric power, this should not hinder the public use of these waters except where it may be dangerous to be near. Furthermore, the construction and operation of the turbines and other equipment should not be in a manner to endanger wildlife and marine life. Any water used should be treated in a manner whereby it will be safe when returned to nature. For instance, if water is used for cooling or steam generation, it should be cooled to near normal before being returned to the estuarine areas.

A lesson may be learned from Doctor Lunz and from the Japanese. A safe percentage of estuarine areas may be set aside and leased for the purpose of fish, shrimp and other marine life farming. The percentage should be arrived at in such a manner as to not endanger the natural propagation of marine life. This type of industry can also increase the amounts of foodstuff available to the American people.

The foregoing should by no means exclude the pleasure and sport fishermen from enjoying the benefits of nature. And as things stand as of this day I see no reason for a license fee to be slapped upon them.

The swimmer, the boater, the skier, the skin diver should all have the privilege of enjoying these estuarine resources without fear of sickness from water pollution and should be conducted in a manner of safety and consideration for the users of these facilities.

The Hanahan community was the first community here in the Low-country to develop a sewage treatment plant. It cost, I think, $1,300,000, and it is now in operation.

CHAIRMAN GARDNER: Next, we have the gentleman that came up evidently from hurricane country, from Miami, Mr. Joe Browder, from the National Audubon Society.

MR. JOE BROWDER: Mr. Chairman, I am Joe Browder, Southeastern Representative of the National Audubon Society. Thank you for this opportunity to express our support for State and Federal action to preserve the estuaries of South Carolina.

I think everyone who is concerned about the future of South Carolina's estuaries would do well to take notice of what is happening right now a few hundred miles south of us. Florida, because of its rapid development, soaring real estate prices, and exploding population, has certainly set some kind of unenviable mark for damaging its natural resources in the name of progress. It became part of the State's economic and political tradition to consider the estuaries something to be dredged, filled, polluted, or otherwise abused and destroyed.

In view of that tradition, what's happening in Florida now is truly remarkable. In the legislature, there is talk of strengthening a recently enacted law that requires biological or ecological surveys of submerged land proposed to be dredged or filled. This week, the Governor and Cabinet extended and clarified an executive order that prohibits the dredging and filling of almost all submerged land along the entire Florida coast, including those areas that are privately owned. This moratorium, which also halted further sale of State-owned baybottoms, will remain in effect until scientists report on the biological values of all Florida's shoreline, and determine how the State can save its remaining unspoiled estuaries.

This sweeping change of policy reflects more than the enlightened attitude of Florida's State government. Even before the State moved, a similar moratorium had been enacted by Brevard County, the booming aerospace center of Florida. In Greater Miami, the County has declared a halt to dredge and fill while the coastline is studied, and the City and County have joined the State in asking the Federal Government to include south Biscayne Bay in the National Park System. On Florida's west coast, the resort city of Sarasota placed its bay off limits to dredge and fill.

Throughout Florida, local and State agencies are moving to control the pollution of bays and rivers.

The rush to save the estuaries isn't happening because all those public officials suddenly became fishermen. Conservationists have helped to convince political leaders of the value of natural resources. But the movement gained widespread support when almost everyone, including the businessmen, realized that saving the bays can help safeguard Florida's economic future.

The Florida Development Commission is the State agency devoted to bringing people, industry, and money to Florida. Tourism is the State's second largest industry. The Development Commission makes a continuing study to find out why tourists come to Florida to spend 4 billion dollars every year.

Many persons assume the big lures would be gambling at the tracks and frontons, or living it up at the nightclubs and plush hotels. But the figures show dancing and night-life in 11th place, and spectator events are number 10 on the list of activities that bring tourists to Florida. Those things looked forward to and enjoyed by Florida visitors are, number one, beaches and swimming, with the atmosphere of relaxation and fun number two. Natural scenery -- not manicured golf courses or lavish architecture, but natural scenery -- is in third place, followed by commercial attractions -- and the most successful of those, like the Seaquarium in Maimi, for example, feature the display of colorful wildlife or natural beauty. Fishing and hunting rank next as activities looked forward to, and, after visits to historical places, the tourists want to enjoy National Parks, State Parks, and boating.

So, while the dollar value of commercial fisheries and other estuarine dependent industries has long been recognized, Florida is learning what we hope South Carolina and the other coastal States are coming to understand: that these natural resources are productive in many ways, and that if we are to remain healthy economically, as well as ecologically, our estuaries must be preserved.

CHAIRMAN GARDNER: Next on the agenda is Mr. Ray Brant, U. S. Forest Service, in Columbia, South Carolina.

MR. RAY BRANT: Thank you, Mr. Chairman.

I am Ray Brant, Supervisor of the National Forest Service in South Carolina. In South Carolina we have two National Forests, the Sumter and the Francis Marion. The Francis Marion National Forest is in the coastal area between Wando and the Santee River. We have some portions of the National Forest that extend to the ocean and can be classified as estuary areas. We have a national forest in North Carolina, Croatan, which also contains some estuary areas. In addition to these estuary areas, we manage considerable acreage of land at the headwaters of various creeks which eventually flow into estuary areas. So, you can see we have a considerable interest in estuaries.

And with this interest, I would like to read a brief statement of our Forest Service policy as it pertains to estuaries.

It shall be the policy of the Forest Service, Southern Region, to retain, safeguard, and preserve National Forest owned estuaries, and, within its jurisdiction, take steps to protect these valuable biological and recreational areas from encroachment, pollution, damage, or destruction by man-made forces. Furthermore, the Forest Service shall cooperate with interested agencies and organizations in all reasonable efforts to restore and rehabilitate National Forest estuaries presently in a damaged condition. The Forest Service shall observe such principles of watershed management, pest control, and land use development on National Forest holdings within the watersheds of estuaries as are necessary to protect such estuarine areas regardless of condition or ownership status.

Thank you, sir.

CHAIRMAN GARDNER: I call again Mr. Bryan. Is he here? Mr. Isaac Bryan?

I have several individuals that have indicated they may be presenting a statement.

Mr. John Edwards.

MR. JOHN EDWARDS: No statement.

CHAIRMAN GARDNER: Mr. J. A. Shipman, of the Shipman Seafood Industry?

MR. SHIPMAN: Yes, I will make a brief statement.

CHAIRMAN GARDNER: Come forward, please.

MR. J. A. SHIPMAN: I didn't prepare a statement for this. I would like to think that I speak as a representative of most of the commercial fishermen of the state.

Unfortunately, whatever is done here concerning this estuary thing that we are referring to at this time, preservation of our entire estuary system, is something that is going to have to be done quickly, because the entire commercial fishing industry in this state is almost not an industry at all. We have seen over the past four or five years that our fishery resources have gone down, steadily down. Doctor Lunz, who has already spoken to you concerning this subject, has been very concerned about this for several years, as we have. We of the industry have been in touch with Doctor Lunz. We have done what limited amount of research we could do. And all things pertaining to our fishermen don't necessarily show statistics. I am not a biologist; I am a fisherman. I am interested in the commercial aspect of the industry. And we don't know what is wrong. We can't put our finger on it. We can see many things that are contributing to it. And of course things aren't worth much, until we come to decisions of this sort.

Our committee that has been appointed to help us eliminate some of these problems is interested in specifics. And unfortunately I can't give any of these gentlemen specifics. I can only tell them that we practically have no industry at all. Our shrimp are being depleted at a large rate. There are no small shrimp in our rivers or creeks at this time. By now we should already be catching a few shrimp. And we are not.

Now, the fishing industry in the State of South Carolina represents a very sizable investment. It employs a good number of people. I personally have been involved in this industry for a little over twenty years. And some of my friends who are here today are not only in the shrimp industry specifically, but we have one man here who is in the oyster business and in the crab business. And the effects have not been primarily on the shrimp but on every aspect of our commercial fishery. And our sport fishing as well.

At the present time, if the trend continues as it has been going over the last few years, I am afraid that we won't have any type of marine life in the State, much less the commercial industry.

Now, I don't claim to know the answer to these things. I can only see what I have been observing over the past few years. But we are aware of the fact that our estuaries do have everything to do with our marine life. I see a few things that have not gone into consideration here. In Beaufort County, primarily in the last two or three years, extensive ditching operations have been undertaken. We are in our large truck farming area. No one will try to argue we don't need insecticides. Farming is a big industry. But one has to observe that before all these ditches were dug into the rivers that we didn't seem to have as many kills as we have now. They spray poison on fields today. We get a big rain tonight, tomorrow we get a big crab kill or we get a big shrimp kill or we get a big fish kill. And it is becoming more prevalent.

Of course I have kept up with some of the literature that has been published. I read "Silent Spring," as no doubt many of you have, of Miss Rachael Carson.

I think the fact there are so many here today shows we are all concerned about this. But certainly we need to take some definite steps now, immediately, before we go into our long-range programs. We need some sort of controls over these things. I will suggest that some control be placed over indescriminate insect control, mosquito control.

I would like to see a whole lot more money be spent on research in the State. Certainly Doctor Lunz has done all he has been able to do with the limited facilities that have been placed at his disposal. I think he has done wonders. But we of the industry don't like to be faced with the possibility of having to change industries in South Carolina, and that looks like what is about to happen to us.

I can only beg of everyone here: You take these things into consideration and ask yourselves whether or not you want a seafood industry in the state of South Carolina.

Thank you.

MRS. J. R. JOHNSON, JR.: I would like to make a statement.

CHAIRMAN GARDNER: Would you come forward, please.

MRS. JOHNSON: My name is Mrs. J. R. Johnson, Jr.

A few months ago I was a member of the steering committee of the James Island Council of Civic and Service Clubs. At that time we were trying to prevent the dumping of spoil. Everybody doesn't know how that turned out. But I really wanted to say that we have heard so many gentlemen from industry come up and make presentations of their industries and what their industries are doing. The commercial fishery is an industry too. And it is a pretty important industry. It produces the most valuable commodity of any industry represented here. And I think it should be given a lot more consideration. The destruction of our marsh lands should stop.

Thank you.

CHAIRMAN GARDNER: Thank you.

I have another maybe: Mr. R. L. McCormack, the South Carolina State Board of Health.

MR. McCORMACK: No statement.

CHAIRMAN GARDNER: I have a card here on an individual who has been extremely quiet thus far today. And he has been waiting for his opportunity. I will introduce him now as Mr. Clair Guess.

MR. CLAIR P. GUESS, JR.: Thank you, Mr. Chairman.

I, on behalf of all of us, would like to express a deep appreciation for the willingness of all of you to come and participate in this public hearing.

As I have viewed the comments made today, I look upon this as a milestone in creating a new climate of understanding within our problem areas. I believe it has also spelled out for us that there are new areas of responsibility.

The record that has been generated here today, to my judgment, has been a clean, clear-cut, pure, honest one, for and on behalf of the State of South Carolina and its people. It seems to me that when it comes from the press that at least for the time being, until we can do better, it will serve as a very good handbook for the members of the Congress, the General Assembly of South Carolina, the delegations of our State, and for all agencies and people who have a public interest in the redevelopment of our State along new lines.

I might add, too, that it is encouraging that within this last April Governor McNair called together several heads of agencies in the State and spoke with them -- some four or five hours of time that is pretty valuable to a Governor -- and he asked us to begin to move together and in unison to study the coastal areas, to study the political institutions, the responsibilities of the several agencies, the private and public interests, and, at no given date in the future, but perhaps as quickly as we could, to make recommendations for the multiple, highest use of our tidelands and coastal areas. I would like to report to you that some eight State agencies having water-related interests and four Federal ones have given us manpower and technology to help bring this study about as quickly as possible. I sometimes fear that maybe we will walk into it too rapidly and overlook some of the important interests. Therefore, we invite you now and from here on through this continuing study for all the inputs that you may have and all the suggestions you may have.

We have just begun. We are taking for the first part of our task force study the tax maps of Charleston County and we are trying to work out a method for the most part that will serve the purpose of the entire coastal area study which is underway. We may not find all things positive and we may not find all things negative. But at least it gives us an opportunity for all of us to develop our highest talents and to work cooperatively toward an end and a goal that we all hope to accomplish in the very near future.

As most of you know, perhaps we are understaffed, but the task force approach at least gives us the opportunity to bring together the reflections of many dissidents, all of which are needed in this great undertaking.

We hope to be able to report to you again within the next six or eight weeks as to what round two holds for us, and some of the guidelines that will go into this task force approach in studying our coastal areas. I wish I could tell you more but this is about as far as we have been able to come in the last three months.

I hope within the next year, with the cooperation that we have, and the high spirit of challenge, that this part of our report will begin to reveal information helpful to all of us.

Now, Mr. Chairman, if I may read to you a telegram that was sent to all of us this morning from the membership of the Oyster Institute of North America, from Sayville, New York:

"The officers and members of the Oyster Institute of North America bring all of you best wishes and high hopes for a most meaningful meeting. The estuarine areas of South Carolina and those of all marine states are interdependent. We trust the report of your meeting contributes to the wisest management of our common estuarine heritage for all the people."

Signed Mr. Gruble, President, and the members.

I have one other document that I have been asked to read into the record. It comes from an attorney in Beaufort, Mr. Joab M. Dowling.

"I am sorry I am unable to attend the meeting on Wednesday, June 5th, due to another engagement, but I did want to take this opportunity to point out to you the great need for some additional government program to assist the sea coast towns in obtaining an adequate sewage disposal system. At this particular moment, we are trying to help the Town of Port Royal with a sewer system, the City of Beaufort with a sewer system, and have had some preliminary discussions with the County authorities on an overall County sewage disposal system. Raw sewage is now being dumped into the rivers in and around Beaufort and Port Royal and this creates a great amount of pollution in the entire area. We have many, many areas of marshland suitable for shell fish that are now restricted and off limits to the public due to this pollution.

"The cost of installing these sewer systems is almost prohibitive in a small community and even with the available government program the amount to be raised by the individual communities is prohibitive.

"We believe that your Committee can do a great service by recommending some additional government grants be made available to smaller communities along the coast in order to accomplish the sewage treatment and disposal at an early date.

"We would certainly appreciate any assistance that can be given."

Mr. Chairman, I believe this concludes my comments at this time.

If there are any questions, I will be glad to entertain them.

Thank you, sir.

CHAIRMAN GARDNER: Are there others that would like to make comment or a statement at this time?

Any of the members of the panel, do they care to make a closing statement at this time?

MR. LINTON: Mr. Chairman, if I might, I would like to express the appreciation of the Water Pollution Control Authority of South Carolina for the Water Pollution Control Administration's interest in the waters of the coastal area of the United States, including those of South Carolina. This is an extremely difficult area in which to function. The cross-currents and connections and lack of connections, and the distortions are myriad and we need to clear the atmosphere.

And I think this mechanism gives a means whereby there will be generated an understanding of the problems and an understanding of some of the responsibilities which are or not discharged, as the case may be.

I would have you, if you would, relate to Mr. Gebhard our sorrow at his not being here but expressing to him our thanks for the favorable substitute he had in his place.

If there are questions that you want to direct to me, I will be glad to answer.

Thank you so much.

MR. LeaMOND: May I ask one question?

As you know, and I hope everybody else knows, Charleston County by law has to, by 1 July 1970, clear up all sewage going into the harbor. And I think you said something about industry.

My question, Mr. Linton, is: What will industry be required to do by 1 July 1970? Is this a matter of fifty, sixty million dollars being spent by property-owners with some from the military? How about the industrial pollution?

MR. LINTON: Yes. I think this is a fair question. And I think industry is well on the road to reviving remedial measures associated with it. Whether or not it can be accomplished by July 1, 1970, I have grave doubts. I also have grave doubts the domestic situation will have been corrected by that particular time. Notwithstanding, the problem that is associated with the clean-up of the Charleston area, as well as the entire coastal area of the State of South Carolina, cannot be associated with any one particular interest, be it a municipal corporation, the ships at sea, or the industries. This is a problem in which all of us are associated and if we don't walk together we are going to hang separately.

MR. LeaMOND: I didn't get too much of it.

MR. LINTON: Ask me a specific question. Do you want me to say that by July 1, 1970, that all industry will have completed installation of remedial measures? I can't say that.

MR. LeaMOND: That is the answer I wanted.

MR. LINTON: I can't say that. Neither can you say that all municipalities in the Charleston area will have completed their installations by 1970.

MR. LeaMOND: I can say this: Work is going on now and anybody who wants to see can take a look over the boulevard down on Ashley River and see what is being done. I would like to see some concrete evidence of industry doing something similar. That is what I want to see.

MR. LINTON: Then I think that unquestionably you cannot see this particular state at the present time. You know that there was a tremendous impetus associated with this particular interest in trying to get the North Charleston Public Service District to assume responsibility for the treatment of some industrial waste in which you are interested. And you also know that considerable amount of the money was invested in that study. And you also know that the result of that study was that they would not accept the industrial waste. They would accept the municipal waste. And that is the situation now. And they are investigating ways and means of providing treatment.

Now I would not be willing to say that by July 1, 1970, that that installation will have been completed. I do say they will be well on the way to providing the treatment that corresponds to the treatment that is being instituted now by the municipalities.

MR. LeaMOND: Let me make one final statement. Let's not concentrate on one industry. That one industry is just a little, tiny segment of a huge, nasty party. But I wanted to get the idea, be informed, that all industry should know that they are expected to do something by 1 July 1970. If they have made good progress but have not completed, I don't think they are going to be penalized. But if they sit around doing nothing from now to 1970, then I am going to do everything I can to see that the law is enforced.

MR. LINTON: I don't blame you at all. The situation is well understood, I think, by all the industries in this particular area. I am of the opinion the Pollution Control Authority is going to issue some directive if by July 1, 1970, appropriate and proper plans haven't been made and remedial plans are necessary.

MR. LeaMOND: Thank you, sir.

CHAIRMAN GARDNER: Anyone else have any comments?

MR. JENSEN: I won't talk but a few minutes at this time.

I will thank you friends from the State agencies, thank all of you who have participated in this. I think it does help to focus attention on the problems of the use of the estuaries of South Carolina, just as it helps us to understand the total problems nationally.

It is interesting to learn that the State is going ahead with a very broad-gage study to determine what these estuary values may be and try to figure out how best to manage them.

It might interest you to know that quite a number of States are doing something similar. California started a couple of years ago. Oregon moved out last year and this year they are talking about a constitutional amendment which would give them cleaner title to their coastal areas. State of Maine started last year. State of New Hampshire adopted similar legislation which gave a single state agency rather broad powers over their estuaries. So many things are happening, I think it is a very good sign. I personally happen to be very interested in this particular effort.

I thank each and every one of you in behalf of the Water Pollution Control Administration.

CHAIRMAN GARDNER: I would like to take this opportunity to put something into the record, and that is my appreciation to Mr. James Holdaway, who is sitting in the back of the room, who put forth a great deal of effort in cooperation with Mr. Guess to make this meeting possible.

Jim, I wonder if you would stand up and be recognized.

(Applause.)

CHAIRMAN GARDNER: I can only repeat some of the things that Mr. Jensen said. We appreciate the response. We appreciate the statements and we appreciate the association with the State agencies, the panel for the questions. I thank you all for being here.

We will close our meeting with that.

(Thereupon, at 2:50 p.m., the meeting adjourned.)

(Letter from Mr. W. Brantley Harvey, Jr., Member from Beaufort County, House of Representatives, State of South Carolina, is copied into the record as follows:

"Dear Mr. Gebhard and Mr. Guess:

"Thank you for your letter of April 22, 1968, announcing the meeting in Charleston on June 5th concerning the effects of pollution in the estuarine zones of the United States. Because it appears now that the South Carolina General Assembly may still be in session during the first week of June, 1968, I may not be able to attend this meeting in person, but I do wish to be on record as favoring any program which will control and reduce pollution in our tidal areas. I would appreciate it if my comments could be incorporated in the record.

"I believe we have in Beaufort County a prime example of the economic hardship which can be afflicted by water pollution and its damage to commercial fishing. Until a few years ago, Daufuskie Island, in the southern part of Beaufort County, had an active shellfish industry. However, due to the water pollution from the sewerage and industrial waste entered into the Savannah River at and near the City of Savannah, shellfish can no longer be taken from the waters adjacent to Daufuskie Island. As a result of the economic depression to which this substantially contributed, the United States Government and the State of South Carolina have had to spend hundreds of thousands of dollars in the past few years for welfare, a VISTA program and various programs of the office of Economic Opportunity. Strict control of pollution on the Savannah River would greatly alleviate this situation.

"In the event it is not otherwise received by you I am enclosing herewith a copy of a resolution passed by the Beaufort County Board of Directors which is the administrative body of Beaufort County concerning this pollution, which resolution I strongly endorsed.

"We are also aware of the detriment to our community of the pollution of the Beaufort River in the area of the Towns of Beaufort and Port Royal in Beaufort County. Preliminary feasibility studies are being made looking toward the establishment of a sewerage treatment facility within a sewerage district encompassing the entire area including the two municipalities. This is a difficult and costly undertaking and any assistance which either the State or the Federal Government can give should be forthcoming at the earliest possible time.")

(The enclosure to Mr. Harvey's letter is copied into the record as follows:

"WHEREAS, pollution of the Savannah River has seriously affected the southern portion of Beaufort County in that many shellfish areas have been closed causing economic losses to the County and particularly to those residents so affected, many of whom reside on Daufuskie Island, and,

"WHEREAS, this pollution is detrimental to industrial water supplies, water sports, boating, fish and wildlife in addition to the shellfish, and,

"WHEREAS, this pollution will seriously affect Beaufort County's potential as a tourist attraction and as a potential location for industry, now,

"BE IT HEREBY RESOLVED, that this Board advise the Beaufort County delegation and our Congressman and Senators of the serious situation that exists and that they be requested to initiate and support such legislation that would curb or eliminate pollution of the Savannah River.")

(Letter from H. H. Von Harten, Jr., of H. H. Von Harten & Sons, Producer & Distributors of Fresh & Frozen Shrimp, Lady's Island, Beaufort, South Carolina, is copied into the record as follows:

"No one can even come close to estimating the actual tonnage or value of seafood lost to the fishermen of the United States because of water pollution. Experts in their field say in years to come with the population increasing at its present rate we will be going to the sea for more and more food. But at the way water pollution is going it will be like Old Mother Hubbard's cupboard, Empty!

"Water pollution can indeed be called the invisible net. At least with a regular net you get some kind of yield out of it, but not so after the poisons have killed or weakened most of the creatures in the water.

"Certainly we cannot blame water pollution for all our problems in the seafood industry but most people in the industry do feel that water pollution is our major enemy.

"My personal opinion is that each state should have one or more biologists or chemists to take water samples at the same stations either monthly or quarterly, at the same time. That is, always take samples on the low water or last of the ebb tide and never on a different tide. It seems anything in the waters would be in the area on these tides. These stations should be located at places where many streams and rivers come down to hold the stations at a minimum. (See diagram attached.) A record of the harmful ingredients in the water should be recorded at each reading to see if it is increasing or decreasing. If increasing, the ingredient should be back-tracked to see where it is coming from and proper steps taken to correct the problem. Whether it is from industrial plants or insecticides from farms (which will probably be high in spring and summer), the big problem is how to stop it before it gets into the water, which is indeed a hard one.")

(Note: The diagram attached to Mr. Von Harten's letter is included in the record as an exhibit.)

(Statement of F. Bartow Culp, President, South Carolina Wildlife Federation, and I. M. Bryan, President, Charleston County Wildlife Federation, is copied into the record as follows:

"We as officers of the Wildlife Federation, are here to record our interest in and concern for the estuaries and ocean beach areas of our state as well as those of all other states which have the same problems.

"Says Dr. Frank Di Luzio, Assistant Secretary of the Department of the Interior: 'The history of our estuaries has been one of steady and accelerating destruction. Today the condition of our estuaries is shocking, their future is bleak and the need for action is urgent.'

"We are in complete accord with all the implications in this statement.

"Without being repetitious, but for the record we list the following:

"1. Esutaries and marshlands are the breeding grounds for our fish, oysters, clams, shrimp and crabs.

"2. Adjacent to areas of growing population our marshlands are rapidly being destroyed - a) by filling, b) by terrifying pollution.

"3. Filling from channel dredging must have careful study in order that it does not obliterate adjacent wildlife, when better planning may save the situation. We acknowledge that shipping and industry are an indispensable part of our economy but their accomodation must be more carefully planned.

"4. Pollution from industry and a growing population are factors which are controllable through methods devised by our modern scientists; let us not be tardy in effectuating this movement.

"Would it not be a wise procedure for South Carolina to have, as some other states have, a Department of Development and Research composed of men of experience and education to resolve these difficult problems?

"We plan to file a more comprehensive statement in the near future in respect to the position which we have taken'.")

(Letter from Jefferson C. Fuller, Jr., Chief of Fisheries, South Carolina Wildlife Resources Department, is copied into the record as follows:

"Reference is made to the Public Meeting concerning estuarine pollution to be held in Charleston, South Carolina, on June 5, 1968. It is requested that this letter be incorporated into the record and considered as representing the position of the S. C. Wildlife Resources Department. It is understood that additional statements from the Department are to be presented by Federal Aid Coordinator Mr. Frank P. Nelson and by the Director of Commercial Fisheries, Dr. G. Robert Lunz.

"For purposes of this statement, an estuary is so defined whereby salt water, brackish water and fresh water are all found within an estuary. Under this definition, sport fishing enthusiasts could normally expect to catch salt water fish, fresh water fish and anadromous fish. No exact monetary figure can currently be assigned to the value of these fisheries. A very strong indication of the value is readily evident in observing the number of fishermen utilizing the resource. An additional indication is reflected in the number of licensed fishermen in South Carolina. In 1953 there were 114,000 licenses sold. In 1967 there were 296,000 licenses sold or an increase of 160%. This rate of increase is several times faster than the rate of increase of the human population in South Carolina.

"Obviously any sport fishery is basically dependent upon water. The quality of the water reflects directly the condition of the fishery. The greater the pollution the smaller the fishery. Since the S. C. Wildlife Resources Department represents the interest of sport fishermen, the Department is vitally interested in maintaining water of high quality in the estuarine areas. With this in mind, the Department hereby makes the following requests to the Chairman of the Meeting:

"1. Water quality criteria for estuarine areas shall not be made nor altered without consideration of written comments as provided by the S. C. Wildlife Resources Department.

"2. No project which effects the estuarine fisheries, directly or indirectly, shall be enacted without consideration of written comments as provided by the S. C. Wildlife Resources Department.

"The Department is eager and willing to cooperate and work with any group or government agency in considering the problems of mutual concern.")

(Letter from Frank P. Nelson, Chief of Game, South Carolina Wildlife Resources Department, is copied into the record as follows:

"Regarding the meeting in Charleston, South Carolina, scheduled for June 5, 1968, I would add further to the remarks by Dr. Lunz and Mr. Fuller of this Department in an attempt to attract favorable attention to the value of marshes and estuarine habitat.

"For the purposes of this writing, no attempt is made to dwell at length on the effects of pollution on all species, rather it is hoped by singling out one species, the importance of all forms in the biota can be emphasized to the extent that the untrained observer looks upon marshlands as something other than wetland deserts.

"It would appear that most professional workers have been exposed to the myriad articles extolling the virtues of wetlands as breeding grounds, and food production grounds, for higher order organisms. However, public awareness and ultimate support must be garnered if any concerted action is to be forthcoming.

"Wildlife species of prominence in typical tidal marshes include the Clapper Rail or marsh hen and while neither its economic importance nor its relative popularity among gunners is particularly high, this game bird along with its fresh water counterpart the king rail occupies practically all the tidewater marshes of this State and many of the others along the Atlantic Seaboard. It is estimated that the Clapper Rail itself occupies 275,000-300,000 acres with a total fall population of around 165,000 birds. Hunters account for approximately 6,000 birds each year, leaving a considerable potential for additional man-hours recreation. A recent postal-hunter-survey shows a total expenditure of 18,400 man-days effort by 5,775 marsh hen hunters.

"The reason more hunters do not pursue the sport of rail shooting is one of economics. The fact remains nonetheless that if present day regulations are modified for this purpose, a significant increase in recreational hunting effort can be expected. This is particularly appropriate in these times of expanding recreational demand on all resources.

"Rails are known to ingest a wide variety of foods including both land and marine mollusks, various crustaceans, polychaete worms, fish, young turtles and small rodents. To a large extent, fiddler crabs appear to be the single most important dietary item. Most of these lower form organisms are highly susceptible to environmental pollution or contamination, and the welfare of the rail, as well as other predatory wildlife, is in direct proportion.

"The continued destruction and quality reduction of marsh and estuarine areas cannot long be tolerated by a civilized and progressive society.

"It is requested that this letter be included in records of the meeting.")

(Statement of Gordon E. Howard, Clemson, South Carolina, is copied into the record as follows:

"Estuaries are an important natural resource to South Carolina. Estuaries are twenty-times as productive of food as the open sea and seven-times as productive as an alfalfa field. Two-thirds of the ocean catch is dependent in some manner on estuaries. Estuaries also provide excellent areas for water-based and water-related recreational activities.

"Over one-half of South Carolina's coastline is composed of estuaries. The productive and recreative values of this vast area must be protected and where necessary deliberately developed.

"The State, counties and municipalities should be encouraged to and aided in the purchase of land adjacent to the estuaries. The water surface, subsurface and the land under the water should remain in the public domain and should remain largely undeveloped.

"Since life in an estuary is dependent on a balance of salt and fresh water, any proposed development that would decrease the flow of fresh or salt water into an estuary should be seriously studied by trained ecologists. Engineers and benefit-cost ratios cannot be relied on to best serve the public interest when areas as delicately balanced as estuaries are at stake. Near destruction of the Everglades National Park is a current example of poor cooperation between ecologists and conservationists, and engineers in dealing with estuaries.

"Legislation prohibiting the dumping of any materials into rivers and streams other than rain and pure water should be enacted. Treated and untreated sewage as well as industrial wastes change the nutrient and acid-base balance in the estuaries destroying life and making them unsafe and unfit for recreation. Recent studies at the Pennsylvania State University show that treated sewage effluent is best filtered by application to cropland. The treated effluent increased the per acre yield and the nutritional value of the crops while concomitantly recharging ground water reservoirs. State support of effluent distribution centers should be considered as a desirable alternative to dumping this material into streams.

"Dredging or filling of estuaries should be prohibited by law except where an established navigable channel must be maintained. Any dredging should be carried out under the direction of ecologists as well as marine engineers.

"A joint board comprised of economists, businessmen, recreation planners, ecologists, conservationists and representatives from the State, county and municipal governments.")

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FEDERAL WATER POLLUTION CONTROL ADMINISTRATION HEARING
CHARLESTON, SOUTH CAROLINA
JUNE 5, 1968

STATEMENT OF JEFF W. NAPIER - OUTBOARD BOATING CLUB OF AMERICA

The purpose of this hearing, to my understanding, is to obtain contributions from interested parties in order to help the Department of the Interior in its management of the nation's estuarine areas. An obvious concern in managing estuarine areas, and our primary concern here today, is pollution control. Other concerns are making optimum use of estuarine areas and determining how this natural resource should be managed generally.

What is the optimum use of an estuarine area? What should be the goal or goals in management of these areas by the Department of the Interior? There are possibly some who would still like to consider estuaries as a handy disposal area for industrial or municipal wastes. Boaters do not share these views.

There are many who feel that a natural resource such as an estuary should be used for the greatest benefit to the greatest number of people - an old democratic concept. This use concept is generally otherwise known as the multi-use concept in recreational circles.

Boaters would largely endorse the multi-use idea for estuarine management as a realistic program to meet the demands for a limited natural resource. We would add one condition, however, The qualification is that we do not feel that the multi-use concept should prevail if such use will destroy the estuary. An estuary is destroyed if some unique and valuable facet of its existence is destroyed. Similarly, we do not think the multi-purpose concept should prevail if it permits one of the uses to so degrade the estuary that the other uses are no longer possible.

The biggest spoiler of unique and valuable estuarine assets is water pollution. The estuarine use most likely to push other users of an estuary out of the picture is the waste disposal or pollution use. Therefore, we boaters favor a multi-use concept for estuarine management - as long as one of the uses is not pollution.

A survey of OBC members on their boating activities was made about a year ago. A nation-wide sampling of about 20% of the membership or about 4,000 persons was taken. The results are informative for our consideration of estuarine management. Forty-three percent of us indicated that we use rivers and coastal waters as our primary boating areas. In many cases, if not most, these areas were estuaries.

Estuarine areas are popular for recreational boating because they offer sheltered waters and a generally good variety of fishing with the close proximity of both salt and fresh water species. Most major estuaries have major cities located nearby which means the estuary is handy for the urban boater. Often they are an enjoyable route to scenic or historical sites. Our concern about estuary management is obvious.

What do boaters use an estuary for? Boating, of course, but that term includes many related activities. Again according to the member survey, ninety-five percent of our members said they spent an average of fifty percent of their boating time just cruising. Sixty-eight percent spent one-third of their time fishing. Sixty-seven percent spent forty percent of their time involved in water skiing. Other boat uses included hunting, swimming, racing and scuba diving. These activities, then, are what should be considered when talking about boating in relationship to estuary management.

enjoyment of our nation's people is hard to measure like all intangibles. Perhaps an indication can be gained from the fact that there are 8 million recreational craft of all types in use in the U.S. An estimated 40 million people go boating every year. Boat owners are estimated to spend $3 billion on all types of new and used boating equipment, fuel and services every year. And finally, boating has been growing at an annual rate of more than five percent in the last several years. It is safe to say that boating is one of the more popular forms of outdoor recreation and is likely to become more popular.

I could provide many more statistics indicating the value of estuarine areas to recreational boating. For the sake of brevity I will not, but rather trust that the general facts and figures given have indicated the great interest of boaters in estuary management. It naturally follows that we are also greatly concerned with problems of pollution of all waters, including estaurine areas.

Probably boaters have observed first hand more of the damages of pollution and littering of more of this country's waters than any other recognizable group of persons - including FWPCA employees. Few groups have a bigger stake in clean water than boaters. Pollution takes the fish out of our fishing, the health from our water contact sports and the beauty from our shores and beaches. It puts scum on our hulls, the stench of oil, chemicals and garbage in the sea air and substitutes a spectrum of bilious colors for blue water. You don't have to sell boaters on fighting pollution.

We cannot make detailed or technical recommendations on how the massive volume of vile liquids from industrial and municipal sewers can be stopped from entering our boating waters. It is unrealistic to think that all of these pollutants can be stopped tomorrow. Federal grants to municipalities and tax concessions to industry for pollution treatment is one answer over the long haul. Will it be enough before some of our waters are beyond redemption?

Consider, for example, my home area of Chicago on Lake Michigan. Just one steel plant in the huge industrial complex at the south end of Lake Michigan pours 440,000,000 gallons of pollutants into the lake every day according to the Illinois Sanitary Water Board. This amount would fill a receptacle a block square and twenty stories high - every day. Since the south end of the lake is not twenty stories deep, the net result is that several square blocks of water area are thoroughly polluted, surface to bottom, every day from this one plant. I'm sure there are similar examples in the estuaries of this part of the country.

It is almost impossible even to imagine how all the recreational boats in the country could equal the spectacular pollution achievement of this one industrial plant on one body of water. Every one of the 8 million recreational vessels in the country would have to be a veritable floating bathroom all year around to do what this one plant - typical of many industrial and municipal polluters - does in only a day. For example, each of the 8 million motorboats, sailboats, canoes and rowboats, regardless of size, would have to be equipped with a toilet. Each toilet would have to flush 2 gallons of liquid, 3 times an hour, 24 hours a day all year long to equal the 440,000,000 of effluent of this one plant on one body of water. Needless to say, this is not the case.

As a matter of fact, four years ago the National Association of State Boating Law Administrators appointed a Pollution Committee to investigate how shipshape boaters were maintaining our nation's waterways. After an exhaustive nationwide survey, the NASBLA Pollution Committee concluded that pollution from recreational boats was negligible in virtually all waters. A few specific areas of heavy mooring in stagnant water areas were the only exceptions. The Committee further found that less than 10% of the nation's recreational fleet is equipped with marine toilets.

Although pollution from pleasure craft was not found to be a problem, the Committee realized that it could become one in some areas and that the lack of a problem would not necessarily forestall a host of non-uniform legislative "solutions." As a result, the Committee recommended and NASBLA adopted a Model Act on Sewage Disposal and Littering from Vessels as a guide for jurisdictions which felt regulation necessary. The recommended Model Act has since been followed by several key boating states.

The Act prohibits untreated sewage discharges into the waters but allows toilet use with chemical treatment devices meeting certain effluent standards, incineration or holding tanks. Just what a minimum treatment standard should be is now in final stages of a study by the National Sanitation Foundation of Ann Arbor, Michigan. This non-profit testing laboratory is being assisted in this work by state and Federal health officers, the people who have the final say on acceptability of treatment devices in their respective jurisdictions.

Endorsement of the NASBLA Model Act implemented by the Sanitation Foundation's uniform performance standards for watercraft sewage treatment devices has come from many quarters. In addition to endorsement by the Outboard Boating Club of America, the National Boating Federation, a national organization of state boating clubs, is in favor of the approach. So is the National Conference of State Sanitary Engineers.

Granting that regulation of discharges from pleasure craft is inevitable, although not generally warranted at this time, the most ideal solution from the boater's standpoint would be adoption of the NASBLA Model Act by all states - covering both waters of exclusive state jurisdiction and waters of concurrent state-Federal jurisdiction. How can we get all states to do this on a uniform and reciprocal basis?

In the final analysis, Federal legislation setting forth guidelines which the states will be obliged to follow may be necessary in order to secure uniformity. There is precedent for this in the Federal Boating Act of 1958 under which 47 states have complied with Federal standards in exchange for the privilege of numbering pleasure craft on all waters within their territorial limits. In the same manner, NASBLA's model act on waste discharge from boats might be made Federal law. Whether state or Federally administered, boaters would have only one basic law governing them in pollution and littering matters. This answer seems very reasonable, logical, workable and in accord with various Federal water quality control laws which set guidelines but leave primary responsibilities of administration and enforcement to the states. "Creative Federalism," I believe it's called.

Regrettably, this is not the approach being taken by the Federal government. Two study reports of vessel discharges were recently prepared by the Secretary of the Interior through the Federal Water Pollution Control Administration - one for the Congress and one for the President. Boaters feel that both the data presented and the recommendations made by these studies are highly unrealistic.

For example, the studies say that 1.3 million pleasure boats out of the 8 million motorboats, sailboats, canoes and rowboats in the country are equipped with marine toilets. That's one out of every six boats! Yet, a recent survey asking all marine toilet manufacturers how many units they had produced since they were in business indicated total production of all marine toilet manufacturers combined to be only 500,000 to 700,000 units. Even if every unit were still in use, total production over the years has amounted to only half of what the FWPCA report claims are in use.

Clearly the researchers of the report did not consult the National Association of State Boating Law Administrators or the NASBLA Pollution Committee or even knowledgeable boatmen when they came up with further breakdowns on the number and types of recreational craft equipped with marine toilets. The report says that 90 percent of all inboard boats, 80 percent of all outboard boats over 16.5 feet in length and 50 percent of all sailboats without auxiliary power have toilets. For 1966, marine industry sales records show that 81 percent of all sailboats sold without auxiliary power were 15 feet or under and about one third of these the surf-board-with-a-sail type. Yet, according to the report, 50 percent of these sailboats under 15 feet in length have toilets. If this were the case boaters should worry more about indecent exposure than pollution.

In view of the inaccuracy of the FWPCA's impression as to the magnitude of discharges from pleasure craft, we would suggest that closer liaison with boating groups should be developed where none has existed heretofore. As a matter of fact, the National Association of State Boating Law Administrators suggested just that by resolution at their annual meeting in San Francisco last November.

We all want to clean up pollution in our nation's waters and we want estuaries to be unpolluted. Boaters are now and have been for years in the forefront of the fight against pollution. We are and have been supporting legislation which would require us to undertake substantial expenses on our boats to insure that they do not contribute to the pollution of our waters. This legislation, notably the NASBLA Model Act or similar provisions is on the books in several states and will be effective in many others within the next two years.

Yet, on the basis of unsupportable facts, the FWPCA steamrollers ahead ignoring the work that has been done to stop even the minimal discharges contributed by boaters. All boaters throughout the country can't even discharge in a year the equivalent volume produced daily by one industrial plant on one body of water.

In conclusion, I submit, that the FWPCA should more effectively direct its efforts by supporting adoption of the NASBLA Model Act and National Sanitation Foundation standards into Federal law enabling greater devotion to the overwhelming task of cleaning up the major sources of pollution. Only by concentrating on the major sources of pollution will our actions be timely enough and of sufficient magnitude to protect and preserve the waters of our nation's estuaries for all who may wish to use them.

JWN/bhm
1/12/68

CLEMSON UNIVERSITY
CLEMSON, SOUTH CAROLINA 29631

WATER RESOURCES
RESEARCH INSTITUTE

May 29, 1968

Mr. Lloyd W. Gebhard, Regional Director
Federal Water Pollution Control Administration
Middle Atlantic Region
918 Emmet Street
Charlottesville, Virginia 22901

Dear Mr. Gebhard:

This is in reference to your invitation of April 22,1968 inviting me, as Chairman of the South Carolina Water Resources Advisory Committee, to attend and participate in the public hearing on pollution problems associated with estuarine areas to be held on June 5, 1968 at the Francis Marion Hotel in Charleston, South Carolina.

At a meeting of the Advisory Committee held on May 16, 1968, your invitation was discussed. After some discussion as to possible contributions by the Advisory Committee it was moved that the Committee's recommendation adopted August 17, 1967 regarding the Proposed Bill H. R. 25 be transmitted to you for inclusion in the proceedings of the hearing. No oral presentation will be made on this subject.

I plan personally to be at the hearing representing Dr. R. C. Edwards, President of Clemson University.

Sincerely yours,

A. W. Snell

A. W. Snell, Chairman of the Directorate
Water Resources Research Inst., Clemson University
and Coordinator, S. C. Water Resources Advisory
Committee

AWS/bck

enc.

cc: Mr. Clair P. Guess, Jr.

RECOMMENDATION
of the
SOUTH CAROLINA WATER RESOURCES ADVISORY COMMITTEE

Adopted August 17, 1967

The objectives of H. R. 25 are to preserve, protect, develop, restore and make accessible estuarine areas of the nation which are valuable for sport and commercial fishing, wildlife conservation, recreation and scenic beauty, and for other purposes. It is believed these objectives are practical and worthwhile.

In general we agree with the objectives of the Bill. We do not agree with the final authority as to decisions being vested in either the Secretary of the Interior or the Secretary of the Army. The Bill provides for "consultation" with State agencies but not their approval. The current value of our State estuarine areas is such that no action should be taken concerning them that is not beneficial to the economy and welfare of the State. It is believed the State should have an equal voice in any program concerning the estuaries within the State and have the right of final consent in any proposed programs. If such a provision is not made, we have no alternative other than to oppose passage of H. R. 25; including of such a provision would justify our support.

June 5, 1968

STATEMENT OF ERNEST W. COOLER AT A PUBLIC MEETING AT THE FRANCIS MARION HOTEL, CHARLESTON, SOUTH CAROLINA, 5 JUNE 1968 RELATING TO ESTUARINE RESOURCES AND MANAGEMENT THEREOF.

Mr. Gebhard
Mr. Guess

Gentlemen:

I am Ernest Cooler, and I live at Table Rock in Pickens County, South Carolina. I am Executive Director of the Pickens County Planning and Development Commission, a director of the Savannah River Basin Development Commission, and a director of the South Carolina Society of Planning Officials. My statement today, however, is not on behalf of any of these agencies. I speak only for myself as an interested South Carolina citizen.

Your request for brevity is commendable, but it is important to recognize the great progress being made in South Carolina in management of its valuable water resource, and I want to thank Governor McNair and the Water Resources Committee for the leadership which has been provided. I am also proud of the firm stand that the Department of the Interior is taking on Water Pollution. I encourage you to move rapidly and deliberately.

Why does a resident of the South Carolina mountains concern himself with the problems of estuarine resources? Why should I travel to Charleston to meet with you to discuss something that is peculiar to the Low Country? Two reasons, principally: (1) Because the albatross is being killed by a lethal substance applied 2,000 miles away and it appears that the great symbol of freedom--the Bald Eagle-has been sterilized by poison, and (2) as an interested South Carolinian I feel that it is important for every thoughtful citizen to support the efforts of the

Governor and other leaders at all levels of government in their sincere search for practical solutions to the most serious long term problem facing mankind - management of, or adaptation to, the conditions of the environment.

With respect to the albatross, I do not believe that this is a problem directly affecting South Carolinians! The destruction of oysters, shrimp, fish, and other estuarine forms most certainly is a problem for all South Carolinians and many others, too. The silting of harbors, the alteration of stream flows, pollution of the estuaries from whatever source or type is of concern to every citizen. Herein lies the difficulty: "Everybody's business is nobody's business." Who killed the albatross?

Unlike the Ancient Mariner, who was alone responsible in Coleridge's poem, we all share the reality of todays intolerable situation. All of us killed the albatross, albeit unintentionally.

When primordial man began emerging from the ancient sea and moved gradually away he travelled the streams and finally the watersheds. Throughout history he has little recognized it,but nonetheless has related to the river basin physically, socially, and economically more, perhaps, than to any other natural phenomenon. From the intellectual heights that we think have been obtained we must now look back to the basin, to our beginning, and the course of our travels in order to discern where we go from here. We are considering here not only the mere management of oyster beds and shrimp populations. We are considering the survival of man.

Mr. Gebhard and Mr. Guess, my small contribution, if any, to your searches will be, hopefully, to reinforce your vast understanding of the problem with approbation. I am sure that you recognize the watershed and the river basin. Somehow we must expedite the organization of the river basin. We must form those bodies of knowledge and authority to control pollution of our resources and environment before the problem becomes insoluble without endangering democracy. Your agencies are pointing the way, but we cannot wait very long. For example, when I was a Low Country boy and net caster it was simple to catch enough shrimp to feed the family with a few casts. We even screened the smaller ones out with large mesh nets. Today it is hard to catch enough for an hours fishing with hundreds of casts, and Georgians share my anguish as well as my responsibility.

We must decide not only on the institutions of management, but we must induce the efforts of our best intellectuals to design the kind of systems approach that we must take.

We must get Resources for the Future to study our problems and recommend courses of action. We must study Resources for the Future and understand the application of its profound discoveries to our environment. Can we South Carolinians wait any longer to complete our emperical research and embark on action programs of a dynamic nature to get results now? I think not.

In Pickens County our leaders have moved toward accomplishment and we eagerly wait for the formation of the larger institutions to which we can relate and become a part of-institutions which only the State and national governments can form. I believe that Pickens County is the first to complete a study of its surface and ground water resources through contract with the U.S. Geological Survey. Charlestonians will recognize that our findings AND WHAT WE DO WITH THEM affects them.

The county delegation has initiated comprehensive planning and has joined with Greenville County for the same purpose to consider common problems and opportunities. We are excited about the results of our efforts to date and the promise that they hold for many areas of concern, including pollution control. Could the systematic, objective, and scientific discipline of Planning be applied to organization and management of our river basins and estuarine resources? We cannot afford to waste another hour, in my opinion, for this is the only practical solution.

Thank you for permitting me to present a statement for your consideration.

South Carolina Shrimpers Association

CHARLESTON, SOUTH CAROLINA 29402

HERBERT M. FULTON
PRESIDENT
WALTER L. SHAFFER, JR.
VICE PRESIDENT
O. B. HEYWARD
SECTY. & TREASURER

P. O. BOX 751
PHONE 723-1674

June 3, 1968

U.S. Department of The Interior
Federal Water Pollution Control Adm.
918 Emmet Street
Charlottesville, Virginia 22901

Attention: Mr. Lloyd W. Gebhard,
Regional Director.

Dear Sir:

This organization would like to call to the attention of this hearing that the South Carolina Water Resources Commission membership is composed of three from industry, three from agriculture, three from municipal government, and one from salt water interest. We contend that the major sources of pollution to our estuaries comes from industry, agriculture and municipal government, and that this is a very strange group to hold an overwhelming balance of power on this commission.

It has also come as a shock to us that it was necessary for The House of Representatives to introduce House Bill No. 3070 of May 21, 1968, which reads as folows:

"That the Pollution Control Authority of South Carolina is hereby requested to prepare, adopt and promulgate by January 1, 1969 such rules and regulations as may be necessary to control air and water pollution in the State with particular reference to Charleston County.

Be it further resolved that a copy of this resolution be forwarded to the Executive Director of the Pollution Control Authority of South Carolina."

After all this time our Pollution Control Authority has not even adopted rules and regulations that meet with Federal specifications.

South Carolina Shrimpers Association
CHARLESTON, SOUTH CAROLINA 29402

HERBERT M. FULTON
PRESIDENT
WALTER L. SHAFFER, JR.
VICE PRESIDENT
O. B. HEYWARD
SECTY. & TREASURER

P. O. BOX 75
PHONE 723-16

June 3, 1968

U.S. Department of The Interior
Attention: Mr. Lloyd W. Gebhard,
Regional Director.

Page 2 of 2

The Shrimp Association wishes to suggest that since the State is so interested in competing for more and more industry, it appears to be doubtful that we will ever get effective pollution control within the alloted time, and it would be to the best interest of all concerned to ask for the Federal Government to assume this responsibility.

Yours very truly,

SOUTH CAROLINA SHRIMPERS ASSOCIATION

Walter L. Shaffer, Jr.

Walter L. Shaffer, Jr.
Vice-President.

WLS,JR/mb

The Blue Channel Corp.

Port Royal, South Carolina 29935
Telephone: 803-524-3153

May 21, 1968

Mr. Lloyd W. Gebhard, Regional Director
Middle Atlantic Region
918 Emmett Street
Charlottsville, Virginia 22901

Re: Pollution Control

Dear Mr. Gebhard:

Because of a conflict, I shall not be able to attend the Pollution Control Meeting to be held in Charleston on June 5, 1968, but would like to submit the following as a statement for your consideration.

Being in an industry which depends entirely upon our estuarine waters for its existence, we are acutely aware of the dangers and effects of pollution, more so than most industries located along the Coast of South Carolina. We directly employ 150 people at our Port Royal plant and an additional 90-100 people are directly associated with the company as procurers of the raw materials. Further, the impact is much more far reaching than just the mere existence of one company - it means the existence of some 250 people in a non-skilled labor pool - a problem of great importance at this time.

For the past two years, we have had an unexplained mortality to our crab population and we now await a repeat for the coming year. To the best of our information, the reduction in supply alone last year meant approximately $250,000 to the local economy and a further decline would add a proportionate amount to this deficit.

Our concern is that no one has supplied the answer to this mortality. Opinions or judgments indicate some form of pollution may be all or part of the cause; therefore, we propose the following:

1. Properly police the waters to attempt to avert catastrophies rather than the position of "remedy the situation after it is too late".
2. Classify our estuarine waters with the intention of upgrading the streams if they are not now Class SA.

Harris ATLANTIC Crab Meat, other Seafoods, and Food Machinery.

3. Work with communities to install proper sewage disposal plants.

4. Undertake a program which will be properly managed, equipped and staffed to undertake the duties of policing, research etc., to fulfill the need to protect our marine life.

With the population of the country rapidly increasing, with industry growing larger and more complex, etc., the problems of pollution will multiply beyond control if immediate steps are not undertaken toward formulating a program whose goal will be to decrease the incidence of pollution. We should not accept stop-gap proposals nor should we accept delays of any form.

Sincerely,

THE BLUE CHANNEL CORPORATION

S. E. Waskiewicz
S. E. Waskiewicz br.
Vice President

SEW/br
CC: Dr. G. Robert Lunz
G. G. Dowling, Esq.
Mr. Clyde Eltzroth
Mr. Murray Woods
S. C. State Legislature

Soil and Water Conservation District

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P. O. Box 857
Charleston, S. C. 29402

JOHN S. WHALEY
Wadmalaw Island, S. C. 2948

April 25, 1968

Reply to:
Drawer A
Chas.,S.C. 29402

Mr. Lloyd W. Gebhard, Regional Directory
U.S. Department of the Interior
Federal Water Pollution Control Administration
Middle Atlantic Region
818 Emmet Street
Charlottesville, Virginia 22901

Mr. Clair P. Guess, Executive Director
S. C. Water Resources Committee
1411 Barnwell Street
Columbia, South Carolina 29201

Gentlemen:

Your letter of April 22, 1968. Water Control has been my great interest for the past 30 or more years. It is with deep regret that I will not be able to be present in person at your public meeting to be held June 5, 1968 at the Francis Marion Hotel in Charleston, S. C. as I will on this date be traveling in Northern Scotland.

On Janury 30, 1967, the S. C. Pollution Control Authority held a hearing in the Court House at Charleston, S. C. My remarks at that time I feel are fitting and probably the best statements that I could at this time make, which in short is that unless upstream control of land and water is not done, there is no control of downstream flow.

We hope you will have a very pleasant meeting in Charleston and I am sincerely sorry not to be there for I would like,Mr. Gebhard, to personally show you some of the advantages of being a Charlestonian and Clair Guess can tell you - that means a hell of a lot.

Yours for SOIL AND WATER CONSERVATION,

By:

T. Wilbur Thornhill.

TWT/dw

Encl/1

Soil and Water Conservation District

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SANTO SOTTILE
P. O. Box 857
Charleston, S. C. 29402

JOHN S. WHALEY
Wadmalaw Island, S. C. 2948

January 30, 1967

Drawer A
Charleston, S.C. 29402

Remarks made by T. Wilbur Thornhill before a hearing by the South Carolina Pollution Control Authority in County Court House at Charleston, 11:A.M., January 30, 1967.

My name is T. Wilbur Thornhill. I reside at 26 Legare Street, City of Charleston. I appear at this hearing as an official representative of the Charleston County Soil and Water District Supervisors and Chairman, Special Committee on Study of Silting of streams and Harbors, South Carolina Association of Soil and Water Conservation District Supervisors.

Let me in the beginning say, I am no expert on the quality of water. I leave that to the technicians to determine and I will go along with what they say.

The Pollution Control Authority might set all of the standards in the world but with our flow in our streams varying as it does, no standard will reasonably hold up but if our streams as to flow and the quality of water in are regulated we can come nearer reaching a resonable, satisfactory standard.

Silt caused by erosion and irregular stream flow causes our greatest pollution.

To qualify my statement as to the varying flow of streams, I quote from the Santee River Basin study Federal Power Commission 1964 report-

		Maximum		Minimum	
River	General Location	Discharge (cfs)	Date	Discharge (cfs)	Date
Salude	Near Columbia, S.C.	67,000	10/2/29	11 1/	7/13/30
Broad	Near Columbia, S.C.	223,000 1,700,000 Gals.	10/3/29	149	9/2/57
Wateree	7 mi. below Wateree Proj.	400,000 3,000,000 Gals.	7/18/16	170 1,750 gals.	6/3/41
Congaree	Near Columbia, S.C.	364,000	8/27/08	588	1/19/42

CONSERVATION • DEVELOPMENT • SELF-GOVERNMENT

From the record that I have submitted, it can be clearly seen that if a sample were taken during the high or maximum flow of our streams it might be all right but at a time of minimum flow it would be all wrong as to quality; therefore, we in Soil and Water Conservation in our state believe that water should be controlled from a scientific method the same as you are trying to control other pollutants.

So many people in Charleston look at the harbor at high flow or discharge of the Santee Hydro-electric and the water seems muddy but today if you look out there when the flow of our rivers are at a very low stage and very little water is being turned into our harbor - the harbor is as clean as it can be. This is a demonstration to show what a pollutant really is and we in Soil Conservation believe and have proven the control of upstream water can be accomplished, not by dams alone but by the treatment of the whole watershed with known methods and if you choose to review the methods of the Pilot Plant in Pickens County we have control of water, its flow and its silt by from 30 to 70. In addition to my statement, I want to say to you, Mr. Chairman, that your organization is doing a wonderful job like all the rest have said here today but we in Soil and Water Conservation want to go a bit further in not only giving you our compliments but telling you that we can control your greatest pollutant which is silt and we offer you our cooperation and advice, and if you don't know how we control silt and quantity downflow of a stream, just call on us and we will show you - not the statistics but by actual proof on the ground with statistics.

Thank you very much Mr. Chairman, for your courtesy and I compliment you on the ability in which you handled this meeting.

STATE OF SOUTH CAROLINA WATER RESOURCES COMMITTEE
1411 BARNWELL STREET, COLUMBIA, S. C. 29201
TELEPHONE (803) 758-2514

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Columbia, S. C.
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Forestry Commission
5500 Broad River Road
Columbia, S. C.

April 30, 1968

Mr. Lloyd W. Gebhard, Regional Director
U. S. Department of Interior
Federal Water Pollution Control Administration
Middle Atlantic Region
818 Emmet Street
Charlottesville, Virginia 22901

Dear Mr. Gebhard:

I have a copy of the letter of April 25 from Mr. T. Wilbur Thornhill, Charleston Soil & Water Conservation District, Drawer A, Charleston, S. C. 29402 written jointly to you and me.

I find Mr. Thornhill's comments most constructive and especially copy of this testimony given before a hearing in Charleston, S.C. on January 30, 1967 before the South Carolina Pollution Control Authority.

I regret very much that Mr. Thornhill will be traveling in northern Scotland at the time of our public hearing on June 5, 1968 at the Francis Marion Hotel in Charleston, S. C.

Accordingly, may I suggest, with your consent, that the text of Mr. Thornhill's comments be included in the record of June 5, 1968 at the time the hearing is held in Charleston.

I have known Mr. Thornhill for a number of years and he has certainly given his best thought, time and attention to one of these major problems which is the silting of streams, harbors and estuaries. I urge that you give this matter your close attention and in the event you feel that any other communication is necessary for Mr. Thornhill in order to make this an official part of the record for the hearing forthcoming, please let Mr. Thornhill and/or me know prior to his departure for Scotland.

With all good wishes, I remain

Sincerely yours

Clair P. Guess

Clair P. Guess, Jr.
Executive Director

CPGJr:h

THE GARDEN CLUB OF AMERICA
598 MADISON AVENUE, NEW YORK, N. Y. 10022
TELEPHONE PLAZA 3-8287

PRESIDENT
MRS. THOMAS M. WALLER

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June 11, 1968

Mr. Lloyd W. Gebhard
Regional Director
U.S. Department of the Interior
Federal Water Pollution Control
Administration
Middle Atlantic Region
918 Emmet Street
Charlottesville, Virginia 22901

Dear Mr. Gebhard:

The Conservation Committee of The Garden Club of America, a national organization with member clubs from coast to coast and in Hawaii, agrees with the proposed study recommended by The Clean Water Restoration Act of 1966 and welcomes the opportunity to urge that positive steps be taken by the state and federal authorities to control the pollution of the rivers and estuaries at once. Every effort should be made to protect the marshes of South Carolina which are so important to the commercial fisheries, not only of South Carolina but of the Atlantic Coast.

All the rivers in South Carolina, especially from the Piedmont, except the Salkehatchie, Combahee and Asapoo, are polluted from their sources, almost to the estuaries. We would like to point out further that special attention be given to the mouths of the Edisto, the Salkehatchie, Combahee, Asapoo, the Broad River, and all the rivers emptying into the bays and sounds south of Charleston, and in addition all the other minor rivers entering same. The rivers around Georgetown and the estuaries are badly polluted by the International Paper Co., and sewage. The Cooper and the Ashley are seriously polluted at Charleston by sewage and chemical waste from the West Virginia Pulp and Paper Company. I believe that these all can be cleaned up.

We believe public action is sorely needed to appropriately develop, effectively manage and wisely use and protect important coastal water and marsh resources in the brackish zone between sea and fresh water. These coastal estuaries, now endangered by pollution and by dredging and filling for real estate development, are the breeding ground and home of fish, shrimp, crabs and shellfish.

Trusting that federal, state and local governments will cooperate in insuring protection for one of this country's great natural resources -- the estuaries and marine resources of South Carolina, I am,

Most sincerely,

Louise H. McKeon

Mrs. Daniel M. McKeon
Chairman
Conservation Committee

GEORGETOWN, SOUTH CAROLINA

TELEPHONE 546-5959
AREA CODE 803

P. O. BOX 12

C. T. "TOM" KELLY
EXECUTIVE DIRECTOR

SYLVAN L. ROSEN
CHAIRMAN

June 4, 1968

U. S. Department of the Interior
Federal Water Pollution Control Administration
Middle Atlantic Region
918 Emmet Street
Charlottesville, Virginia

Gentlemen:

In our efforts to obtain new industries as well as encourage the expansion of existing industries, this organization has consistently pointed out the need for control of pollution, both air and water.

The City of Georgetown is now in process of installing a new sewage system which is 75% completed. It should be finished by mid autumn and will cost $1½ million.

One of our major industries is spending $1,400,000 to clarify water being discharged into Sampit River at Winyah Bay.

I am enclosing the copy of a letter from Georgetown Steel Corporation which outlines their willingness to comply with the requirements of the State Pollution Control Authority. This company will complete its construction by July 1, 1969.

I also enclose a letter which was presented at a hearing conducted by the South Carolina Pollution Control Authority dated January 29, 1968.

Sincerely yours,

C. T. Kelly

C. T. Kelly,
Executive Director

CTK/jo

Enclosure

The Senate
State of South Carolina

C. CLAYMON GRIMES, JR.
SENATOR, GEORGETOWN AND HORRY COUNTIES
SENATORIAL DISTRICT NO. 18
SENATE OFFICE NO. 2

HOME ADDRESS:
BOX 563
GEORGETOWN, S. C. 29440

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RURAL ELECTRIFICATION

Columbia
GEORGETOWN, S. C.

January 29, 1968

C
O
P
Y

TO WHOM IT MAY CONCERN:

Please be advised that in reference to the reclassification of streams in Georgetown County I am personally in favor of raising classification as high as possible. Specifically insofar as Waccamaw River is concerned I feel very strongly that Waccamaw River should be reclassified as a class A stream. I further feel that all unclassified streams in the County should be classified in the A category.

Due to commitments in the Legislature it is impossible for me to attend the proposed hearing and personally express my feelings in this matter. I would like to state, however, that for the benefit of the coastal area a class A classification is most desirable in attracting people to our area and exploiting the natural resources and advantages we have.

I further feel that any industry that is worth having will provide the necessary guards against air and water pollution.

Sincerely yours,

C. CLAYMON GRIMES, JR.

Georgetown Steel Corporation
SOUTH FRASER STREET
PHONE 546-6173
POST OFFICE BOX 619
GEORGETOWN, S. C. 29440

May 31, 1968

Georgetown County Development Commission
P. O. Box 12
Georgetown, South Carolina

Attention: Mr. Tom Kelly

RE: WATER POLLUTION CONTROL
File P5A

Dear Tom:

We have received your letter of May 29 and the letter written by Mr. Lloyd W. Gebhard relating to water pollution control.

Please be advised that Georgetown Steel is prepared to comply with all Federal, State and local pollution control measures in every way. We attended a meeting in Columbia with Mr. Bill Linton to discuss the requirements of the Pollution Control Department and are familiar with the various regulations.

At the present time our water treatment system has not been designed, but all pollution measures will be accounted for in the design of the water system. At the present time it is intended that no impurities will be dumped into the Sampit River whatsoever. We will probably use a system that recirculates our water.

Again I wish to emphasize that we are most concerned about water pollution and will do our part in keeping the river free of contamination.

If you have any further questions, please call me.

Sincerely,

GEORGETOWN STEEL CORPORATION

W. P. Stephens
Vice President

WPS/bz

THE CITADEL
THE MILITARY COLLEGE OF SOUTH CAROLINA
CHARLESTON, S. C. 29409

OFFICE OF
THE STAFF ENGINEER

12 June 1968

Mr. Clair P. Guess, Jr.
Executive Director, S. C. Water Resources Committee
Federal Water Pollution Control Administration
Middle Atlantic Region
918 Emmet Street
Charlottesville, Virginia 22901

Dear Mr. Guess:

I was present at the morning session of the public meeting held in the Francis Marion Hotel on June 5, 1968 in Charleston, South Carolina. Attached is a copy of my statement for the record.

Sincerely yours,

R. D. McCarty
Col., Staff Engineer

RDM:op

1 Incl.

Statement of Colonel R. D. McCarty of The Citadel

Mr. Chairman, Ladies and Gentlemen, I am Colonel R. D. McCarty, staff engineer at The Citadel, representing General Hugh Pate Harris, the President of the Citadel.

I believe all of us present in this room are keenly interested in pollution abatement whether it be water or air. We all know there is considerable water pollution in the estuarine areas of Charleston. Industrial wastes of many types, commercial vessels, recreational watercraft, inadequate sewage treatment or absence of any treatment are probably the major causes of such pollution. It cannot be entirely eliminated but it can be reduced by public awareness of the contributing causes, public and private action, and the construction of treatment plants and the like. Some industries have spent considerable sums of money to alleviate the problem; more needs to be done. Litter and garbage thrown overboard from recreational watercraft or left on beaches by bathers contribute significantly to water pollution yet it should be controlled as is litter along our major highways controlled in many states.

Public meetings such as this one point up the magnitude of the problem and focus public attention on it briefly. However, unless positive action is taken, the situation may become more acute because of the continuous urban and industrial growth of the area.

CHARLESTON TRIDENT CHAMBER OF COMMERCE

DEVELOPING CHARLESTON, DORCHESTER AND BERKELEY COUNTIES

P. O. BOX 975
CHARLESTON, S. C. 29402
TEL. 803/723-2521

STATEMENT OF POSITION

The Charleston Trident Chamber of Commerce, acting as the representative of business and industry in the Charleston, Berkeley and Dorchester Counties, enters the following Statement of Position for the record regarding estuarine pollution and related problems.

I. The Trident Chamber of Commerce recognizes the need for clean waters and that complex problems regarding the maintenance of the waters in and around the Trident Area exist. The Chamber of Commerce believes the solution to these problems can be found in a joint program by State and Local Governments, Manufacturing and Shipping, Commercial Fishing and Interested Citizens.

II. The Trident Chamber of Commerce notes it has endorsed the United States Corps of Engineers' report on Shoaling in Charleston Harbor and recommends work begin as soon as possible on a diversion canal to divert the flow of silt-laden fresh water from Lake Moultrie.

III. The Trident Chamber of Commerce recommends consideration be given the feasibility of comprehensive land and water use zoning for the entire South Carolina coast.

IV. The Trident Chamber of Commerce further has publicly endorsed the deepening and widening of the channels in Charleston Harbor and desires this process begin as soon as possible in order to meet competition from neighboring states.

V. In conclusion, the Trident Chamber of Commerce recommends standards and criteria of pollution control for South Carolina coastal waters be established and enforced by the State.

The Charleston Trident Chamber of Commerce appreciates the opportunity to enter the above statement and wishes to be kept abreast of developments regarding this Public Hearing.

W. Kenneth Johnson
Chairman
Harbor Improvement Committee
P. O. Box 975

June 20, 1968

STATEMENT SUBMITTED IN BEHALF OF VARIOUS DREDGING COMPANIES AND ASSOCIATIONS BEFORE THE UNITED STATES HOUSE OF REPRESENTATIVES, COMMITTEE ON PUBLIC WORKS, SUBCOMMITTEE ON RIVERS & HARBORS

S. 2760

Section 3 of this bill relating to oil pollution requires clarification. The new Section 19 of the Water Pollution Control Act, as passed by the Senate, would in effect prohibit dredging operations in connection with projects for the improvement of navigable waters or construction of public works authorized by Acts of Congress.

Senate Report No. 917, which accompanied the bill, recognized the necessity of maintaining the Nation's waterways for economic growth and national security. The Senate Public Works Committee Report also indicated that since "dredging involves oil which was previously discharged", this subject should be treated separately. Thus, it would appear that the Senate did not intend for dredge spoil to be subject to Subsection 19(b) or for dredging operations to be subject to the criminal or civil penalties set forth in Subsections 19(c), 19(d), and 19(e).

MAY 7 1968

Definition of Oil

The problem is created by the term "oil" as defined by Subsection 19(a)(1). The use of the phrase "oil mixed with other matter" was apparently intended to control "waste materials discharged from shore installations [which] contain various quantities of oil mixed in with the material". But the bill as reported out of the committee failed to distinguish, by definition, "oil mixed with dredge materials" from "oil mixed with waste materials discharged by shore installations".

This deficiency in the Senate bill can be rectified by amending Subsection 19(a)(1) to read:

> "(1) 'oil' means oil of any kind or in any form, [other than dredge spoil,] including, but not limited to, fuel oil, sludge, oil refuse, and oil mixed with ~~other~~ [waste] material".

The intent of the Senate amendments to the Water Pollution Control Act, as stated in Report No. 917, was "to provide an effective deterrent against oil spills whether these spills emanate from a vessel or from a shore installation". The Senate recognized that the primary source of oil pollution is caused by oil spillage "during the transportation of oil" and oil discharged from various shore facilities, such as "storage tanks, petroleum, industrial plants, and pipelines".

There was no apparent intention to prohibit dredging operations or to interfere with or impair public projects necessary to maintain the navigable waters of the United States or to prevent industry from maintaining or improving their dock facilities. If dredging operations were to be prohibited, restricted or curtailed, the economic consequences to the country would be catastrophic. Trade, commerce and industry in the United States would be paralyzed.

Dredging Abates Pollution

It is important for this committee to realize that dredging is a tool for abatement of pollution. It is not a cause or source of pollution. There is no oil spillage during the dredging process, except possibly a minor exudence from existing sedimentation in the water being dredged. Dredging is the only available means for removing polluted materials from the bottom of lakes, rivers, and harbors.

Much has been said about dredging and dredge disposal in connection with water pollution. But, there is no competent evidence to support the presumption that dredging operations adversely affect the quality of water. Tests conducted by the Government also show that after a period of time polluted material deposited in the Great Lakes disposal areas are no longer polluted and that fauna is healthier and appears to be more thriving than in adjacent lake bottoms. 1/

Dredging reduces pollution. The dredging process adds oxygen to the polluted materials by exposing the materials through agitation thereby enabling nature to dissolve and purify the materials. Any effort to discourage or lessen dredging will not only impede pollution abatement but will stifle the economic growth and development of inland ports.

Whatever effect the dredging process may have on sedimentation or pollution, by spillage, leakage or dumping of dredged materials, it is so infinitesimal that it is incapable of being measured.

1/ See testimony Gen. Wm. F. Cassidy, Chief of Engineers, before the Senate Appropriations Subcommittee on Public Works (1968) relating to "Pollution Tests Near Dredge Disposal Areas".

On the other hand, the benefits to be derived from dredging are so great and the damages so slight, if any, that the consequences of not dredging completely overwhelms any other considerations.

Subsection 19 Would Make it Unlawful to Dredge

Under a literal interpretation of Subsection 19(b), the Secretary of Interior is given the power, for example, to abolish or prohibit the use of authorized dumping areas in the Great Lakes, established under the provisions of the Act of March 3, 1905, [33 U.S.C. 419], for maintenance dredge spoil.

The Chief of Engineers recently testified, before the Senate Appropriations Subcommittee on Public Works, that the costs of alternate methods of disposal in the Great Lakes "would be from three to five times the present costs". But, actually this is only one standard for measurement. The overall impact would be much greater since in many instances there is no way to dispose of dredged materials other than by dumping them in the authorized lake disposal areas. Thus, if this bill was passed by the House, in its present form, it will be impossible in many cases to maintain the navigable waterways or harbors of the Great Lakes or elsewhere.

The Secretary of Interior would also have the implied power, under Subsection 19(b), to shutdown dredging operations whenever there was a trace of oil in the water around the dredging plant or equipment even though the discharge was harmless. The contractor would always be confronted with the burden of proving that his operations were not the cause of the discharge before he could continue his work. The cost of doing business under these conditions would become prohibitive.

Present Critical Situation

At the present time private dredging work in the Great Lakes and other areas has, in effect, been stopped or shutdown because the Federal Water Pollution Control Administration has failed or refused to agree to the issuance of permits by the Corps of Engineers. As a result, railroads, steamship lines, oil companies, steel firms, and other large industrial concerns have been unable to maintain their dock facilities for loading and unloading cargo. This condition threatens to unduly interfere with the economic development of inland ports. The situation is critical now. If this bill goes through, without excluding dredge spoil or dredging operations, all dredging work would be seriously jeopardized.

Subsection 19(k)

Subsection 19(k) merely contributes to the present chaotic situation. Any further regulation of dredge spoil or dredging operations should be deferred until the results of the Pilot Study authorized by Congress last year are available. This subsection should be deleted if the definition of "oil" is changed as hereinbefore suggested.

Existing Legislation

There is already an overabundance of pollution legislation. As a result of the hodgepodge of such legislation, confusion is rampant, no one really knows what effect, if any, most of this legislation will have on eliminating or reducing pollution, millions of dollars are being spent with no assurance of any reasonable benefits; and at the present time an administrative paralysis has set in because of the overlapping and conflicting responsibilities and duties between responsible federal agencies. Time should be allowed for full implementation of existing legislation before passing new legislation.

The lack of expertise in the field of pollution is best illustrated by a recent article in TIME Magazine [March 29, 1968] dealing with the TORREY CANYON disaster. This article stated:

> "Resorting to emergency techniques much
> the same as those used recently in Puerto

> Rico, British cleanup squads sprayed detergents along the coast of Cornwall after the tanker Torrey Canyon went aground last year. Scientists now report that the detergents did more damage to marine life than did the oil.
>
> After months of study, Plymouth Laboratory Director J. E. Smith and his colleagues calculated that thousands of sea birds, died from being coated with oil or from swallowing it. But except for the rosy-footed summer tourist, few other shore or sea creatures were seriously bothered by the oil. The detergents, however, killed a significant amount of sea life and seriously upset the ecology in many coastal areas. * * * " [2]

This study bears out Senator Muskie's remark during the 1967 Water Pollution Hearings, when he said:

> "* * * the committee must give cognizance to the need for research into methods of removal of oil * * * while at the same time not using techniques which secure the malady but kill the patient."

Oil Pollution Act of 1924

The point was made in the Senate Hearings "that the Oil Pollution Act was made unenforceable by a word change in the Senate passed definition of the word "discharge". Therefore, S. 2760 is also "designed to correct that fault". This Committee should scrutinize the proposed revisions before abolishing the Oil Pollution Act of 1924, as amended [33 U.S.C. §432-434].

---

[2] Torrey Canyon Pollution and Marine Life, A report by the Plymouth Laboratory of the Marine Biological Association of the United Kingdom, Edited by J. E. Smith, Cambridge University Press, [1968].

The Secretary of Interior's Report to the President, February 1968, states that the omission of shore-based facilities from the 1966 Amendment to the Oil Pollution Act is "critically significant". If this is so, the omission can be easily cured by amending the Act to add "shore installations" as defined by S. 2760.

However, the Secretary of Interior's recommendation to delete the "grossly negligent or willful" criterion of the Act is a much graver matter. The argument made is that the present statute is difficult to enforce. This may or may not be the case. But, the fact is that the Department of Justice, based on testimony set forth in the Senate Hearings on Water Pollution (1967), has not attempted to prosecute any cases under the 1966 Amendment to the Act. Thus, there have been no court cases on this question. Obviously any prosecutor would like to have his job made as easy as possible. But, here we are dealing with a federal penal statute that is no longer confined to "any vessel using oil as fuel for the generation of propulsion power, or any vessel carrying or having oil thereon in excess of that necessary for its lubricating requirements", as provided for in the original Oil Pollution Act of 1924 [33 U.S.C. 433]. The 1966 Amendment changed the Act to apply to "any boat or vessel" upon the navigable waters of the United States.

If the "grossly negligent or willful" criteria is deleted any owner or operator, for example, of an outboard motor boat using the navigable waters of the United States would be subject, upon entering into such water, to an automatic conviction for committing a federal felony under Subsection 19(c), or at the very least face being convicted of a federal misdemeanor under Subsection 19(d) of S. 2760. This bill provides a means for wholesale convictions of all citizens or business entities using the waterways regardless of criminal culpability. The stated penalties are exceedly harsh [up to a year in prison]. To impose such penalties as provided for in Subsection 19, without the "grossly negligent or willful", criteria would be unconscionable.

With respect to the alleged difficulty of enforcing the existing legislation, it is interesting to note that the Secretary of Interior has still not promulgated ~~on~~ or issued regulations under the 1966 Amendment [33 U.S.C. 433 (c)] relative to permissible quantities of discharge of oil from boats or vessels, or relating to the removal or cost of removal of oil from the navigable waters or the adjoining shorelines of the United States. This may explain the reason for the alleged difficulties encountered by the Government in enforcing the 1966 Amendment to the Oil Pollution Act of 1924.

S. 2760 as presently written, when considered together with the Refuse Act of 1899 [33 U. S. C. 407] as judicially interpreted, will make it unlawful to drop anything but "pure water" into a river or lake which are part of the navigable waterways of the United States. This would be true even though the discharge was harmless or had no deleterious effect on the waterways.

Refuse Act of 1899

This Act made it unlawful for any ship, barge, or other floating craft of any kind, or any shore installation to discharge into the navigable water of the United States, or any of its tributaries, any refuse matter. The U. S. Supreme Court, in United States v. Standard Oil Co., 384 U. S. 224, 16 L ed 2d 492, 86 S. Ct. 1427 (1965), opinion delivered by Mr. Justice Douglas, broadly and liberally construed the term "refuse" to include "oil" of any kind whether waste or useful, and to encompass "all foreign substances and pollutants", apart from those "flowing from streets and sewers".

The Department of Justice, during 1967 Hearings on Water Pollution by the Senate Public Works Committee, acknowledged that "vessel- caused oil pollutions can be prosecuted under that act", based on the aforesaid Supreme Court decision. But, they contended that this was not a "complete solution" since the violator was not obligated to clear up his spill.

The obvious answer to this contention is for the Department of Justice, in appropriate cases, to file an action under the Oil Pollution Act of 1924, as amended to clean up the spillage. The Act, as amended, should be subject to judicial interpretation prior to being repealed by Congress merely because of an untested belief that it may be difficult to enforce.

Certainly the Senate bill in its present form would not provide a "complete solution" relative to enforcement of the Act. Not unless mass conviction of all users of the waterways would satisfy this requirement. The proposed Act, as written, would be impossible to police or enforce since anyone using the waterways would technically be guilty of violating its provisions. .

Recommendation

A common sense approach is required. The answer is simple. If the "grossly negligent or willful" criteria is to be eliminated then it is necessary to revert to the scope of vessels used in the Oil Pollution Act of 1924, prior to the 1966 Amendment, or to vessels carrying oil as cargo.

The above modification to the Oil Pollution Act of 1924, as amended, [33 U. S. C. 433] together with the insertion of the term "shore installations" would cover the primary sources of pollution for which S. 2760 was intended to proscribe.

H. R. 14000

Should this Committee decide to recommend the repeal of the Oil Pollution Act of 1924 rather than amend existing legislation as proposed above, then it is suggested that the following language of Subsection 19(k) of H. R. 14000 be retained:

> "(k) Nothing contained in this section shall extend to, apply to, or prohibit operations in connection with projects for the improvement of navigable waters or construction of public works, authorized by Acts of Congress. Further, this section shall not be construed to authorize the issuance of permits by any other Federal agency for disposal of dredged materials from such authorized projects. ~~Whenever the disposition of such materials into the navigable waters of the United States is proposed by any department or agency of the United States, or any public or private agency under Federal permit or license, the Federal department or agency involved shall first consult with the Secretary of the Interior with a view to the prevention of pollution of such waters by oil. The Secretary of the Army in cooperation with the Secretary of the Interior shall, within one year after enactment of this Act, develop guidelines governing disposal of such dredged matters~~".

In view of the Memorandum of Understanding between the Secretary of Army and the Secretary of Interior, dated July 13, 1967, the third sentence of Subsection 19(k) should be deleted. It is also urged that the fourth sentence of this Subsection be deleted pending the results of the Pilot Study programs heretofore authorized by Congress.

The definition of "oil" [§19(a)(1)] should be revised as suggested in the aforegoing commentary of S. 2760.

H.R. 15906

It is urged that Subsection 21(a) be amended to read:

> "SEC. 21(a) As used in this section, the term 'matter' means any substance of any description or origin, other than oil [or dredge spoil], which, when discharged from a vessel or shore installation into any waters in substantial quantities, presents, in the judgment of the Secretary, an imminent and substantial hazard to the public health or welfare."

One final observation. It is ironic, but one of the absurd results of the proposed legislation when considered in conjunction with S. 2760 and H. R. 14000, is that the owner or operator of a vessel who removes a discharge of oil by detergents, or other means, pursuant to the provisions of S. 2760 and H. R. 14000, can be held liable under H. R. 15906 for introducing hazard substances into the waters. See Professor Smith's report on the "Torrey Canyon" studies on pollution and marine life, supra.

H.R. 13852

We urge the defeat of this bill to prohibit or abolish dumping in authorized dumping areas in the Great Lakes established

under the provisions of the Act of March 3, 1905, or any other Act, for the reasons hereinbefore stated.

Respectfully submitted,

John A. Downs, President
Great Lakes Dredge & Dock Company
Chicago, Illinois

Maylin H. Greaser, President
American Dredging Company
Philadelphia, Pennsylvania

E. D. Wattles, President
Dunbar & Sullivan Dredging Company
Detroit, Michigan

National Association of Rivers &
Harbors Contractors
Baltimore, Maryland

River & Harbor Improvement Association
Milwaukee, Wisconsin

Southeastern Dredge Owners Association
Chesapeake, Virginia

Gulf Coast Dredging Association, Inc.
New Orleans, Louisiana

May 3, 1968

REPORT OF THE POLLUTION STUDY COMMITTEE

NATIONAL ASSOCIATION OF STATE BOATING LAW ADMINISTRATORS

NOVEMBER 8, 1965

WARWICK HOTEL
PHILADELPHIA, PENNSYLVANIA

REPORT OF THE POLLUTION STUDY COMMITTEE, NATIONAL ASSOCIATION OF STATE BOATING LAW ADMINISTRATORS

November 8, 1965

At the Oklahoma City meeting of the National Association of State Boating Law Administrators, held November 18-20, 1963, a Committee was appointed to develop a report on the nature and extent of pollution of the waters of the United States by recreational watercraft and to make recommendations relative thereto. The following were appointed as members of this Committee:

CHAIRMAN

Keith Wilson, Director, Michigan State Waterways Commission

MEMBERS

Bernard W. Chalecki, Director, Connecticut Boating Safety Commission
Peter J. Gannon, Chief, New Jersey Bureau of Navigation
John Grenoble, Member, Pennsylvania Fish Commission
DuWayne Henrie, Boat Registration Section, Arizona Highway Department
Milton Johnson, Director, Minnesota Boat & Water Safety Division
James J. O'Brien, Director, New York Division of Motorboats
Wilton Vaugh, Director, Massachusetts Division of Motorboats
Ron Stone, Government Relations Department, Outboard Boating Club of America

A review of information provided to the Committee by the Outboard Boating Club of America indicated a reason for the concern of the Association in this area. According to OBC, a total of 23 states have already adopted legislation controlling the discharge of sewage from recreational watercraft on some or all of the individual state's waters, while many other states are considering such action. These totals include only states specifically legislating on this subject and do not include those states which may have passed laws dealing with trash, garbage, litter, etc.

The approach to this problem by the various states appears to be characterized by its individuality. In almost every instance, the boat pollution laws adopted by one state have little or no resemblance to those adopted by others, even in the case of neighboring states. Legislation involving varying and differing standards presents a considerable problem to the boatman who wishes to use his boat in a number of different states.

Further complicating the picture is the propensity on the part of the individual states to select one type of anti-pollution device and to permit only its use in the particular state. Whether this is done deliberately or in ignorance of the existence of other equally suitable devices is not known. In any event, it further complicates the mobility of boats cruising on the waters of more than one state.

STUDY METHOD

In view of the extensive activities in the various states on this subject, it was concluded by the Committee that there must be available a number of detailed studies analyzing the extent of pollution of waters by recreational watercraft. Accordingly, the first action of the Committee was to attempt to gather together all such reports to permit an analysis of the nature and extent of pollution by recreational watercraft of the waters of the United States.

An extensive survey of Federal agencies and of agencies of all of the states was made to locate such reports. This survey resulted in turning up only two reports that dealt in any manner with this problem. One report dealt with the effect of pollution from houseboats in the vicinity of Portland, Oregon, and was prepared by the Oregon State Sanitary Authority.

The second report, entitled "Survey of Marina and Watercraft Use in Relation to the Public Health Aspects", and jointly prepared by the Macomb County Health Department and Michigan Department of Health, dealt specifically with this problem.

Because of the inability of the Committee to assess the nature and extent of pollution by recreational watercraft from only two reports made in widely separated parts of the country, an alternative method of assessing this problem was developed. This was by means of a questionnaire designed to elicit responses from boating, health, and recreation officials throughout the country from which conclusions could be drawn. The questionnaire is reproduced as Appendix A.

The questionnaire was mailed to some 200 agencies in and out of government, both state and Federal, including public health departments, water pollution control boards or commissions, state boating law administrators, and virtually every Federal agency having any connection with waters used for recreation. A cover letter was provided with the questionnaire explaining the desire of the Committee to determine whether or not recreational boating is a significant contributor to the water pollution problem, and requesting the assistance of the addressee. The returns were most gratifying and extremely helpful. More than 90 replies were received representing one or more agencies in almost every state A list of the agencies responding and a summary and analysis of the replies received is reproduced as Appendix B.

In the course of its study, the Committee collected a large number of newspaper clippings, magazine articles, and similar releases dealing with this subject. Many of these articles and clippings were especially helpful and presented insights into the over-all problem under study. Reproduction of these articles is not feasible, but several of those considered by the Committee are as follows: "Boat Sanitation" by Elbert Robberson, Yachting magazine, October, 1964; "Federal Policy Proposed on Disposal of Wastes", The Waterways Journal, July 11, 1964; and "Water Pollution from Boats", Boating Industry magazine, January, 1964

THE EXTENT OF THE PROBLEM

The two reports dealing with pollution from houseboats and recreational watercraft were carefully reviewed by the Committee, because they were the only such reports located. An evaluation of the Oregon State Sanitary Authority Report on Houseboats is very well summarized by the conclusions stated therein and appearing on page 10 of the Report:

> "1. Domestic wastes including garbage from approximately 294 houseboats are dumped without treatment into the Willamette and Columbia River in the vicinity of Portland. This represents a population of between 500 and 1,000 persons. Inclusion of boathouses, marinas, and other waterfront facilities would increase this number somewhat.
>
> "2. The measurable organic and chemical pollution load from houseboats in the Portland area is relatively small compared to the total pollution load discharged from all sources.
>
> "3. Aesthetic nuisance conditions resulting from floating materials and health hazards from pathogenic organisms are considered to be the significant pollutional factors involved.
>
> "4. Collection and adequate disposal of houseboat wastes can be accomplished with reasonable application and modification of present equipment and techniques.
>
> "5. All but one or two houseboats in the lower Willamette River are located at established marinas, in groups of 20 or more, which are within reasonable pumping distances of city of Portland sewers.
>
> "6. All but 10 or so houseboats in the Columbia River, adjacent to the Portland area, are in groups of 5 or more and subject to service by group facilities.
>
> "7. The requirement for treatment of wastes from houseboats and boathouses would make it possible to require installation of holding tanks on boats which could be pumped out for a nominal fee at practically any marina or moorage along the River.
>
> "8. It is believed that the collection and treatment of disposal of wastes from houseboats and boathouses could be required and enforced under existing state statutes and regulations."

The significant conclusions are contained in paragraphs 2 and 3 where it is noted that the pollution load from the subject craft is relatively small compared to the total pollution load from all sources but that a nuisance and health hazard is created by floating wastes. The extent of the health hazard could undoubtedly be debated at considerable length, but the nuisance factor of floating waste materials cannot be refuted. It is to be noted that no mention of trash, litter, or similar materials is made in the report.

The Michigan Report resulted in conclusions very similar to those of the Oregon Report. The complete Summary and Conclusions can be found on page 23 of the Report and only selected paragraphs are reproduced here:

> "2. While the study was designed to obtain data relative to sewage pollution and sanitation conditions at marinas it was evident from statements made under the item 'comments' on the questionnaire that there was great interest in watercraft safety (reckless driving, operator training, and operator licensing) and pollution other than sewage, i.e., trash, garbage, beer cans, wood or other floating debris.
>
> "3. The bacteriological sampling program showed that the water quality at six of the fourteen stations was extremely variable with high coliform concentrations a significant percentage of the time. The eight remaining stations showed a water quality quite variable but with coliform concentrations under 2500 for 95% of the time and no statistically significant difference detectable among these stations. The water quality at all stations was so variable that there was no statistically significant difference between any two stations or groups of stations It was therefore not possible to measure the effect of pollution which might be contributed by a marina area into adjacent waters whether this be a stream or along the shoreline of a lake.
>
> "4. The stations which showed the highest chloride concentrations also showed some of the highest biochemical oxygen demand concentrations and in nearly the same order, namely (4, 5, 1, 2, 8, and 3) and (5, 4, 1, 2, 8 and 3) respectively. Concentrations actually decreased from a point on the river above the marinas to a point on the river below the marinas. The opposite trend would be anticipated if pollution from marina areas which might be detected by a sampling program was contributing a significant pollution load to the receiving stream in relation to pollution already in the stream as measured by these parameters."

The Report also concluded, through the process of deductive logic, that raw sewage was being discharged from recreational watercraft:

> "8. Observations of watercraft use while away from home port indicate the majority of one day trips cover from 3-1/3 to 7 hours on the average and it is evident that the head would be used under these extended use conditions. Since the high percentage of watercraft now in service are not equipped with holding tanks for sewage or macerator chlorinator devices, raw sewage is being discharged into the waters of the state from watercraft."

The Michigan Report made no recommendation or reference to the nuisance and/or health hazards created by floating wastes, nor was any reference made to trash, garbage, and litter, even though the Report did mention that great interest in these matters was evidenced by the completed questionnaires gathered as a part of the Report. Both reports concurred in the fact that the pollution load attributable to houseboats and recreational watercraft was relatively small and, in fact, could not even be measured in Michigan. Both also concluded that raw sewage was being deposited in the water from these craft.

An analysis of the questionnaires returned to the Committee established the fact that very few officials believed that pollution attributable to recreational watercraft was much of a problem. The results of the questionnaire are summarized in Appendix B but it should be noted that an average of all answers indicated that trash disposal from recreational watercraft was the greatest problem, followed by sewage, garbage and waste, in that order.

The Committee also reviewed such information as was available to determine the number of recreational watercraft within their various registered fleets that actually possessed marine toilets. Inasmuch as no statistical data was available on this subject, it was necessary to resort to estimates. It was concluded, after careful analysis, that a maximum of 10% of the recreational watercraft of any one state contained marine toilets and that the national average would probably be less than 5%. Necessarily, the craft with marine toilets were the larger craft which are generally located on coastal and Great Lakes waters rather than on small land-locked lakes.

The general use patterns followed by owners of recreational watercraft were also noted. It was found that only a very few watercraft were used for any extensive periods of time as dwellings but that, rather, most use was concentrated on weekends, holidays, and during summer vacations. Further, the boating season of most states was found to be rather limited with the exception of the southern, southwestern, and western states. As an example, it was noted that in Michigan the boating season is regarded as extending from May 1 to November 1, a period of six months, but that virtually all boating use was confined to the months of June through early October. Even if it was assumed that 10% of all recreational watercraft in Michigan contained marine toilets, that six persons were regularly utilizing the watercraft, and that the average boat was in use in one form or another for 60 days per year, the extent of pollution attributable to these craft would certainly have to be classified as negligible.

COMMITTEE FINDINGS

From the two health reports on this subject that were turned up by its research, from the results of its questionnaire survey, and from the results of its own independent analysis, the only conclusion that can be reasonably established and logically defended by this Committee is that pollution from recreational watercraft is, at most, negligible. This pollution is so slight on the total scale of pollutant sources that it is, at this time, unworthy of the considerable attention it has been given.

To support the finding of this Committee as to the relative insignificance of pollution from recreational watercraft, the Committee draws the reader's attention to a report on pollution of the Detroit River and Lake Erie, released by the U. S. Public Health Service on May 8, 1965. The report resulted from a two and one-half year study by the Public Health Service of these waters and found that pollution had reached a stage hazardous to human health, fish, wildlife and recreation. The report further claimed that 1.6 million gallons of waste flows into the Detroit River annually, "one-third from municipalities and two-thirds from industries." The report charged that the Scott Paper Company alone discharged wastes "equivalent to oxygen-consuming capacity to the untreated sewage from a population of over 800,000 persons."

The report recommended "correcting the pollution from six municipalities, industrial establishments, and three Federal installations" and estimated th cost of remedial measures at $200 million. The subject is still under debate in Michigan and promises to be actively discussed for many years before the situation outlined in the report is corrected, if ever

Based on the assessment by the Committee of the total boating population in this country with marine toilets, the patterns of use of such craft, and the total days per year they are in operation, it is the opinion of this Committee that the pollution of the Detroit River which is caused by municipalities and industries is of greater national concern than such pollution as is caused to the nation's waters by the total recreational boating fleet of this country.

But if the Committee is correct in its conclusion, then how can the vigorous legislative activities in this field on the state level and, now, on the Federal level, be explained? The only explanation available to the Committee is that curbing whatever pollution is attributable to recreational watercraft is considered to be reasonably easy, and is therefore a good place for health officials wishing to make a start in this field to begin. Further, because such legislation affects a relatively small percentage of the population of a given state and because the goal of the legislation is admittedly for the good of all, it is difficult for those opposed to such regulation or the form it takes to gain any appreciable support for their position.

If this has been the source of the considerable legislative activity on this subject in the past, then it is the inescapable conclusion of this Committee that it will continue to be in the future. That such legislation can and often does impose incalculable and unnecessary hardships on recreational boat owners hasn't deterred such efforts in the past and is unlikely to be of greater significance in the future.

The Committee predicts that legislation prohibiting entirely the use of a marine toilet on the waters of a given state will continue to be passed in the future as it has in the past, even though no action of any consequential nature is taken by the same state to clean up the heavy pollution of its waters caused by municipal and industrial wastes.

What can and should recreational boat owners or the National Association of State Boating Law Administrators do to correct this situation? Should we oppose each and every attempt to curb such pollution as can be attributed to recreational boating because it is of such insignificance in the total pollution picture? Should we advocate a total program to correct all pollution as an alternative to regulations covering boating alone? Or should the Association continually refer to this report and its conclusions in hopes that this alone will reduce legislative activity in this field?

Reasonable though any of these courses of action may appear, it is obvious that none of them will result in action favorable to recreational boat owners Legislating against pollution in any form is gaining popularity, and opposing anti-pollution legislation or regulations is comparable to opposing motherhood or the American flag. The situation has passed the point where reasonableness is a criteria so that concerted opposition to such regulation by recreational boat owners or groups representing them, regardless of the facts in their favor, will accomplish nothing constructive and might even result in the adoption of harsher regulations than would otherwise be the case.

The Committee believes that what must be done by this Association and by other recreational boating interest groups in the country is recognize that regulation of this problem, regardless of its significance, is certain to continue; that such regulations will continue to vary considerably from state to state; that many, if not a majority, of the regulations in this area will be of the type completely prohibiting the discharge of wastes in any form, whether treated or not, from marine toilets; and that such regulations will be injurious to the mobility of recreational boating that this Association is attempting to foster in other fields.

If this is so, then what can be done to amend or modify these regulations so that they are less injurious to recreational boat owners and to the mobility of recreational craft? The solution suggested by the Committee is the preparation of a model law on this subject that will avoid the shortcomings of most of the present regulations and still alleviate the problem of the discharge of untreated wastes from recreational watercraft.

Before such legislation can be effective, however, there must be available anti-pollution devices capable of installation on recreational craft at a reasonable cost. An assessment of such devices is then necessary.

ANTI-POLLUTION DEVICES FOR RECREATIONAL WATERCRAFT

There are three principal types of treatment devices now available:

1. Chlorinators. Chlorinators are devices designed to hold sewage for at least a nominal period of time to permit introduction of dosages of disinfectants to kill bacteria contained therein. To meet any reasonable health standard, such units must be equipped with a macerator or with some other type of agitator which will cause the breakup of solids to permit disinfection and to inhibit settling of solids in the chlorinator.

2. Incinerators. These units are designed to trap the waste material, generally in a previously inserted bag, and to hold the materials until the device is activated. Upon activation, the bag with the sewage materials is dropped into a burning chamber where it is consumed by a burner which is ignited by turning the burning control as prescribed. These units are usually provided with exhaust fans to remove odors from the area to over-board vents Generally, appropriate controls are provided to assure that the device cannot be activated when the toilet is in use.

3. Holding Tanks. A holding tank is simply a waste tank placed on board the vessel and attached to the marine toilet so that all materials are pumped from the toilet into the tank. Such devices can be emptied in one of two ways, the first through a pump attachment which empties the tank into a shoreside sewer or septic tank and the second by pumping the materials directly into the waters of the lake.

Each of these units has some disadvantages which should be mentioned.

1. Chlorinators. An "Evaluation of Marine Toilet Chlorinators" is a report prepared by Syracuse University in 1962 for the New York State Department of Health and contains some excellent suggestions relative to the use of chlorinators. This report as well as the experience of others in using chlorinators indicates that the devices must retain the waste materials for a minimal period of time to assure adequate treatment by the disinfectant used with the device. Also, should the boat owner allow the disinfectant source to become depleted, there is no way that the unit can be designed to continue to hold the materials until a disinfectant is introduced. It is believed that this situation could be greatly alleviated simply by having manufacturers of

such devices print on the devices themselves or on literature designed to be placed in the head of a boat, instructions as to its use. It is not considered probable that many boat owners who have had these units installed will permit them to be regularly operated in a manner designed to destroy their effectiveness.

2. Incinerators. The principal objections to units of this nature relate to their size and to the fact that most use propane gas as fuel. In other respects, they are considered to be the most effective anti-pollutant device because they destroy the wastes entirely. Although the size limitation cannot easily be modified, the danger of introducing propane gas on board a boat can be almost completely reduced by a carefully designed and proper installation of the unit and the fuel bottles.

3. Holding Tanks. Units of this nature seem to have the greatest appeal to health officials, probably because they are regarded as the next best thing to actually sealing a toilet. However, these installations are not without disadvantage. If holding tanks are to be pumped ashore, relatively expensive sewer installations at marinas are required. If they are to be emptied in outlying waters, the possibility of their being discharged at dockside will continue to exist and, should such happen, would completely negate the installation of the device. Holding tanks also require considerable space on board boats where space, regardless of the size of the boat, is always limited. Holding tanks should have chemicals added from time to time to reduce the increased bacteriological effects of retaining sewage for prolonged periods of time. The longer such materials are retained without the introduction of appropriate chemicals, the more virulent the waste materials become. However, it is believed that with the provision of appropriate instructions to the user, any boat owner utilizing such an installation will assure that it is used properly.

Although there are disadvantages to each of these units, it is not felt by the Committee that these are such that the only alternative to continued pollution is the sealing of toilets. Certainly these units will perform with no less effectiveness than the average municipal sewage treatment plant, and because of the boat owner's interest in unpolluted waters, it is believed by the Committee that the units will be carefully and properly maintained and operated.

It is therefore the conclusion of the Committee that suitable and adequate devices are presently available for installation aboard recreational watercraft that will treat sewage to a standard acceptable to most health officials. Since any of the three units above are acceptable treatment devices, and since the selection of one of the three by a boat owner will be based on personal considerations, it is recommended that a model law permit the use of any of the three devices.

MODEL LAW

After concluding that suitable anti-pollution devices were available for installation on recreational watercraft, the Committee requested the Outboard Boating Club of America to prepare a model law dealing with the general subject of pollution from recreational craft. This model law has been extensively reviewed by the Committee and others, and suggested revisions or modifications incorporated into the final draft which is included in this Report as Appendix C. This model law provides for several features that are worthy of individual mention.

To assure that the standards required by such legislation do not vary from state to state, they have been incorporated into the model act as a part thereof. This is most important, for one of the principal justifications of this model act to the Committee has been that adoption thereof nationally would greatly facilitate the mobility of recreational craft. If individual standards could be established by each state, this mobility would be completely destroyed and the purpose of the act entirely negated.

The Committee was also impressed by testimony of manufacturers of anti-pollution devices wherein they pointed out to the Committee that the trend in current legislation was to require a complete laboratory test of every anti-pollution device by its manufacturer before the unit would be accepted by the particular state. In an effort to reduce this expense to the manufacturer, and to avoid duplicate tests of an almost identical nature, the Committee has permitted the manufacturer in the model law to certify in writing on the basis of any test which the manufacturer makes of its unit, whether or not the unit meets the requirements of the model act.

In other respects, the model law has been drafted in such a manner as to assure that it can easily be used without major amendments in any State in the country. This was, of course, done intentionally in hopes that the goal of uniformity in this legislation would be further accommodated.

LITTER

During its investigations, the Committee was impressed with the number of persons who, when discussing pollution from recreational watercraft, were concerned only with the depositing of trash, garbage, and other materials in the water which, perhaps, could be more appropriately termed "litter". Before receiving the results of its questionnaire survey, it was the personal opinion of most of the Committee members that the litter problem was of greater concern than the problem of pollution, and the questionnaire results confirmed this belief.

American ingenuity being what it is, it appears that food and beverage containers are becoming more and more indestructible. Milk cartons, beverage cans and bottles, and other food containers are not only extremely resistant to deterioration through exposure to the elements, but most of them float, resulting in their accumulation on the beaches adjacent to heavily used waterways. Even when the items washed up on the beach are not necessarily dangerous to humans, they offend the senses because they are so foreign to the area. Since they do not appear to naturally waste away and since they are not capable of being eaten by fish, fowl, or wildlife, the only way they can be removed is through human action and such is difficult, if not impossible, when the cost of patrolling the thousands of miles of shoreline of this nation is considered.

This does not mean that recreational boat owners are the primary offenders in this area. There is no question in the Committee's mind that a substantial amount of this litter is being deposited by the crews of commercial vessels plying these waters. Because such crews eat all meals on board and naturally consume a far greater amount of foods per person than is consumed by recreational boat owners who, although greater in numbers, cruise much less and appear to eat on board less frequently, it is apparent that the continued practice of dumping all waste materials over the side into the waters will result in a large accumulation of litter on the beaches.

The litter problem is not easily resolved simply by passing legislation. This is a problem which can only be resolved through a direct attack utilizing all possible means to educate every segment of the public as to the problem and its likely effects if not abated. Appropriate legislation can be helpful, however, to ensure that marinas and public boating facilities provide trash receptacles and that commercial vessels are required by law to destroy materials through incineration or to place them in trash receptacles for disposal on shore. Because of this, provisions of this nature are included in the model law recommended herein by the Committee.

IN CLOSING

The Committee has attempted to maintain an objective approach to the problems covered by this report. As more and more evidence was uncovered indicating the miniscule nature of the pollution problem and the gargantuan efforts being made by persons who should know better to correct it, the objectivity of the Committee lessened considerably. Still, we believe we have well and amply supported our conclusions herein.

The Committee was appalled at the tremendous amount of industrial waste and untreated sewage being regularly deposited in the lakes, streams and rivers of this country. Although it was gratifying to the Committee to establish to its complete satisfaction that virtually none of this pollution was the result of the use of recreational watercraft, this limited satisfaction was completely overwhelmed by the staggering knowledge of the condition of much of our water. Indeed, unless much stronger efforts to correct this situation are made in the future than have been made in the past, there may well be no recreational watercraft in existence to worry about because no waters suitable for recreation will remain.

APPENDIX A

QUESTIONNAIRE ON WATER POLLUTION BY RECREATIONAL WATERCRAFT

STATE OF MICHIGAN

Waterways Commission

GEORGE ROMNEY, GOVERNOR

1004 CADILLAC SQUARE BUILDING
DETROIT, MICHIGAN 48226

LEONARD H. THOMSON
DETROIT

DR. WALLACE S. WILLMAN
TRAVERSE CITY

LOUIS H. FREYE
ROMEO

CHARLES A. BOYER
MANISTEE

VOLMAR J. MILLER
PAW PAW

KEITH WILSON, DIRECTOR
TEL. 222-1800

May 25, 1964

Dear Sir:

The National Association of Boating Law Administrators is an organization consisting of State officials concerned with programs involving the registration, regulation, and development of facilities for recreational watercraft.

Because of the considerable concern being expressed throughout the country at this time about the continuing pollution of our waters, it is the desire of this Association to determine the extent of such pollution attributable to recreational boating. After basic determinations of this type have been made, it is the further intent of the Association to make recommendations to the various States of ways to combat pollution from this source.

To assist the Association's Pollution Study Committee, it is requested that you complete the enclosed questionnaire and return it to the Outboard Boating Club of America which is serving as special Staff Assistant to the Committee on this study. If you are unable to complete the questionnaire yourself, it is requested that the form be forwarded to the appropriate State agency having jurisdiction over this matter.

Your cooperation in this important study will be most sincerely appreciated.

Very truly yours,

Keith Wilson
Chairman, Pollution Study Committee,
National Association of Boating
Law Administrators

QUESTIONNAIRE ON WATER POLLUTION BY RECREATIONAL WATERCRAFT

Completed by

NAME ______________________________

REPRESENTING ______________________________

ADDRESS ______________________________

The object of this questionnaire is to try to develop information and data on the extent of water pollution attributable to recreational boating, whether or not such pollution is a significant factor, and the nature and measure of corrective action to be taken, if any, which will provide a remedy without unduly penalizing the boat owner.

For purposes of this study, the term "recreational watercraft" is defined as every description of vessel, regardless of method of propulsion, which is used or capable of being used as a means of locomotion on the water for recreational pursuits.

1. Can you estimate, from boat registration data or any other appropriate source, the number of recreational watercraft in your State with marine toilets? Yes ___ No ___

2. If the answer is "Yes," please indicate in the following space how many recreational watercraft with marine toilets you estimate to be operating on waters in your State. ______________________________

3. If your area of jurisdiction is defined other than by state boundaries, please explain and, if possible, estimate the number of recreational watercraft with marine toilets in your area. ______________________________

____

____

4. Can the total number of recreational watercraft with marine toilets in your State or area be broken down according to boat size? Yes ___ No ___

5. If the answer is "Yes," please indicate in the spaces below the number of recreational watercraft with marine toilets in your State or area in each of the following size groups:

________ Less than 26 feet in length
________ 26 feet to less than 40 feet in length
________ 40 feet to not more than 65 feet in length

6. If you have a numerical breakdown of recreational watercraft with marine toilets classified other than by size or length of the vessel, we would appreciate having this information. Please show any such data in the following space.

____

____

____

7. Can you estimate the number of recreational watercraft without marine toilets in your State or area? Yes ___ No ___

8. If the answer is "Yes," please indicate how many. ______________________________

9. Below are listed the types of water, some or all of which may exist in your State or area. Please mark the degree and kind of pollution FROM RECREATIONAL CRAFT ONLY on your waters.

Mark the degree of pollution by circling #1, 2, 3 or 4. For example, on rivers and streams, sewage and/or garbage, trash and waste FROM RECREATIONAL CRAFT are possibly contributing to pollution. If, in your State or area, sewage is a MAJOR contributor to pollution, circle #1; if MODERATE, circle #2; if a MINIMAL contributor, circle #3; if it does NOT contribute, circle #4. Do the same with garbage, trash and waste, marking the degree of each in each type of water.

	SEWAGE	GARBAGE	TRASH	WASTE
EXAMPLE: RIVERS AND STREAMS	1 2 [✓ 3] 4	1 2 [✓ 3] 4	1 [✓ 2] 3 4	1 2 3 [✓ 4]

DEFINITIONS

Sewage: The contents of a drain, especially human excrement.
Garbage: For example, animal or vegetable matter from a kitchen, market or store.
Trash: Something discarded as no longer useful or not useable, especially paper, metal, wood, glass or plastic products.
Waste: Material lost or unused during a process, leakage, e.g., motor oil.

KEY

1 Circling this number means that the kind of pollution listed is a MAJOR contributor to pollution in your area.
2 Circling this number means a MODERATE contribution to pollution.
3 Circling this number means a MINIMAL contribution to pollution.
4 Circling this number means NO contribution to pollution.

TYPE OF WATER	KINDS OF POLLUTION			
	SEWAGE	GARBAGE	TRASH	WASTE
COASTAL OR OCEAN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
GREAT LAKES	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
INLAND LAKES				
Under 500 acres	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
500 acres or over	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
RIVERS AND STREAMS	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
RESERVOIRS	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

10. How is the problem of pollution from recreational watercraft being handled in your State or area: by regulation? ___ by education? ___ otherwise? ___ Please elaborate. ___

11. Do you have any suggested solutions over and above what is already being done to combat pollution from recreational watercraft in your State or area?

12. To your knowledge, have any studies been made in your State or area regarding contribution to the water pollution problem by recreational watercraft? Yes ___ No ___ (In answering the foregoing, you may include studies by public health or water pollution agencies of Federal, state or local government, and/or studies by universities and private research organizations or any other studies of which you may know.)

If the answer is "Yes," and copies of these studies are available in your files, we would greatly appreciate your sending one of each to us along with this completed questionnaire.

If extra copies of these studies are unavailable to you, it is requested that you furnish all appropriate names and addresses where we can write for copies of such studies. Please give these sources of information in the space provided below.

13. In your opinion, are boating groups and individuals self-policing in efforts they make to keep the water clean and shoreside areas clean for their own sake?

14. Do you think marinas are contributing to water pollution by lack of adequate facilities at docking and mooring areas to remove sewage from boats or garbage and trash deposited in the water? Yes ___ No ___ Please comment. ___

15. Additional comments, if any ______________________________

PLEASE RETURN THIS QUESTIONNAIRE, UPON COMPLETION TO:

OUTBOARD BOATING CLUB OF AMERICA
307 NORTH MICHIGAN AVENUE
CHICAGO, ILLINOIS 60601

APPENDIX B

FINDINGS OF WATER POLLUTION QUESTIONNAIRE SURVEY

FINDINGS OF WATER POLLUTION QUESTIONNAIRE SURVEY

Scale of Degree of Pollution
1.0 - 1.5 Major
1.6 - 2.5 Moderate
2.6 - 3.5 Minimal
3.6 - 4.0 No problem

KIND OF WATER	SEWAGE	GARBAGE	TRASH	WASTE	AVERAGE VALUE OF ANSWER
COASTAL/OCEAN (30 responding)	3.0	3.3	3.1	3.3	3.2
GREAT LAKES* (7 responding)	2.9	2.9	2.7	3.1	2.9
INLAND LAKES					
Under 500 acres (50 responding)	3.2	3.2	2.8	3.1	3.1
500 acres or over (45 responding)	3.1	3.0	2.7	3.1	3.0
RIVERS AND STREAMS (54 responding)	3.1	3.2	3.0	3.1	3.1
RESERVOIRS (43 responding)	3.2	3.1	2.9	3.3	3.1
AVERAGE VALUE OF ANSWER	3.1	3.2	2.9	3.2	

A. How is the problem of pollution from recreational watercraft being handled in your state o area? (52 responding)

Regulation 42.3%   Education 21.2%   Both 36.5%

B. Are boating groups and individuals self-policing in efforts they make to keep the water an shoreside areas clean for their own sake? (58 responding)

Yes 39.6%   No 46.6%   Boating groups and clubs are but not individuals 13.8%

C. Do you think marinas are contributing to water pollution, etc.? (61 responding)

Yes 62.3%   No 37.7%

* The figures for the Great Lakes may be misleading inasmuch as the total number of response concerning this type of water was only seven. Therefore, a single extreme response will affect the final average answer more than a single such response would in any of the other KIND OF WATER categories.

Of 91 State and Federal agencies who answered the questionnaire only 8 cited pollution from recreational watercraft as a major contributor to the over-all water pollution problem by circling #1 on the questionnaire form. They and the kind of pollution they stressed are as follows:

1. Division of Water Safety
   Alabama Conservation Department
   --Sewage and waste on rivers and streams

2. Chief Sanitary Engineer
   Arkansas State Board of Health
   --Trash on lakes under 500 acres; trash and waste on lakes 500 acres or over; trash and waste on rivers and streams; garbage, trash and waste on reservoirs

3. Georgia Department of Public Health
   --Garbage and trash on lakes under 500 acres

4. Michigan Department of Health
   --Trash on Great Lakes

5. Sanitary Engineering Division
   North Carolina State Board of Health
   --Sewage on coastal or ocean waters, lakes under 500 acres, lakes over 500 acres, rivers and streams, and reservoirs

6. Municipal Waste Section
   Division of Water Resources
   West Virginia Department of Natural Resourc
   --Sewage and waste on rivers and streams

7. Region 6, U. S. Forest Service
   (Oregon and Washington)
   --Trash on lakes under 500 acres

8. Boat License Division
   Illinois Department of Conservation
   --Sewage and waste on rivers and streams

AGENCIES RESPONDING TO QUESTIONNAIRE

Division of Water Safety
Alabama Conservation Department

Boat Registration Branch
Arizona Motor Vehicle Division

Water Quality Control Board
California Resources Agency

Water Pollution Control Engineer
Colorado Department of Public Health

Sanitary Engineering Division
Connecticut State Department of Health

Small Boat Safety Division
Delaware Commission of Shell Fisheries

Engineer
Florida Board of Conservation

Division of Water Resources
Florida Board of Conservation

Georgia Department of Public Health

Environmental Health Engineering
Hawaii Department of Health

ho Motor Vehicle Bureau

Division of Public Health
Alaska Department of Health & Welfare

Chief Sanitary Engineer
Arkansas State Board of Health

California Division of Small Craft Harbors

Bureau of Sanitary Engineering
California Department of Public Health

Chief Boat Warden
Colorado Game, Fish & Parks Department

Boating Safety Commission
Connecticut Dept. of Agric. & Natural Resources

Harbor Precinct
Washington, D. C. Metropolitan Police Departmen

Florida Boating Council

Bureau of Sanitary Engineering
Florida State Board of Health

Georgia Game & Fish Commission

Harbors Division
Hawaii Department of Transportation

Public Health Biologist
Engineering and Sanitation Division
Idaho Department of Health

Kansas Forestry, Fish & Game Commission

Kentucky Water Pollution Control Commission

Maine Water Improvement Commission

District Engineer
Maryland Department of Water Resources

Massachusetts Division of Motorboats

Michigan State Waterways Commission

Section of Water Pollution Control
Minnesota Department of Health

Water Pollution Board
Missouri Department of Public Health & Welfare

Montana Pollution Control Sect., Aquatic Biol.
Montana State Board of Health

Boating Division
Nebraska Game, Forestation & Parks Commission

Motorboat Section
Nevada Department of Motor Vehicles

New Jersey Marine Patrol

New Mexico Park & Recreation Commission

Division of Environmental Health Services
New York Department of Health

Sanitary Engineering Division
North Carolina State Board of Health

Division of Water Supply & Pollution Control
North Dakota State Department of Health

Ohio Division of Watercraft

State Sanitary Authority
Oregon State Board of Health

Division of Harbors & Rivers, Rhode Island

Rhode Island Department of Health

Division of Law Enforcement
uth Dakota Game, Fish & Parks Department

Boat Licensing Division
Illinois Department of Conservation

Superintendent of Waters
Iowa Conservation Commission

Division of Boating
Kentucky Department of Public Safety

Boating Division
Maryland Department of Chesapeake Bay Affairs

Sanitary Biologist
Massachusetts Department of Public Health

Michigan Department of Health

State Boating Safety Committee
Mississippi Game & Fish Commission

Sanitary Engineer Director
Water Supply and Pollution Control
Missouri Department of Health, Education & Wel

Montana State Board of Health

Environmental Health Services
Nebraska Department of Health

Nevada State Health Department

New Hampshire Water Pollution Commission

New Mexico Department of Public Health

Division of Motorboats
New York Conservation Department

Division of Stream Sanitation
North Carolina Dept. of Water Resources

North Carolina Wildlife Resources Commission

North Dakota Game & Fish Department

Oklahoma Planning & Resources Board

Oregon State Marine Board

Division of Sanitary Engineering
Pennsylvania Department of Health

Division of Boating
South Carolina Wildlife Resources Department

Tennessee Game and Fish Commission

Texas Department of Health

Utah Boating Division

Sanitary Engineering Section
Washington State Department of Health

Municipal Waste Section
Division of Water Resources
West Virginia Department of Natural Resources

Sanitary Engineering
Wisconsin State Board of Health

Wyoming Game & Fish Commission

Motor Vehicle Division
Texas Highway Department

Virginia Commission of Game & Inland Fisheries

Washington Pollution Control Commission

West Virginia Department of Health

Port Advisor
Wisconsin Department of Resource Development

Wisconsin Department of Conservation

Wyoming Department of Public Health

U. S. COAST GUARD

Third District (New Jersey, Connecticut, Vermont, portions of New York, Pennsylvania, Delaware

Eighth District (Louisiana, Texas, New Mexico, portions of Alabama, Arkansas, Mississippi, Georgia and Florida)

Thirteenth District (Washington, Oregon, Idaho and Montana)

U. S. BUREAU OF RECLAMATION

Region 2 (California)

Region 4 (Colorado, Wyoming, New Mexico, Arizona)

Region 5 (Oklahoma, Texas, Colorado, Kansas, New Mexico)

U. S. FOREST SERVICE

Region 5 (California)

Region 6 (Oregon and Washington)

Bureau of Sport Fisheries and Wildlife
Regional Office, Oregon

Headquarters
Bureau of Outdoor Recreation

National Park Service
National Capital Region

Tennessee Valley Authority

ANALYSIS OF RESPONSES TO QUESTIONS 11 AND 15 OF WATER POLLUTION QUESTIONNAIRE SUBMITTED BY WATER POLLUTION STUDY COMMITTEE, NATIONAL ASSOCIATION OF BOATING LAW ADMINISTRATORS

It would appear from the questionnaire that the pollution problem created by recreational watercraft is considered to be, in most waters, negligible. A few quotes from the questionnaire will suffice in this regard:

> "In my opinion, pollution from recreational craft is infinitesimal."
>
> "Make cities and communities put in proper disposal plants. Get at the source -- clean up the big polluters like cities, towns, industry and shore cottages."
>
> "Most of the trash in our freshwater streams is left by people fishing on the banks."

Answers to the questionnaire indicated that, of the small part of the pollution problem created by recreational watercraft, trash thrown overboard by individuals was of the greatest concern. Most individuals believed that members of boating organizations, clubs, etc., are fairly well self-policing. The majority of those replying suggested education through literature, posters, and clubs as the best and ultimate solution to stopping whatever pollution is being contributed by recreational watercraft users -- "the water they pollute is their own" idea. An example of a successful education program against water pollution is that conducted by the Ohio River Valley Water Sanitation Commission, which has done a big job in the last few years through educational programs.

It was the consensus of those replying that the marine toilet is not a noticeable contributor to water pollution where it exists, with the exception of a few areas of heavy boating concentration, notably marinas. Those replying said that marinas could and should solve their problems by providing adequate shore facilities and regulating marine toilet use by those docked at the marina. Rough figures indicate that on a nationwide average, less than 10% of all recreational watercraft have marine toilets. Necessarily, these are larger craft which are found more often on coastal and Great Lakes waters than on small land-locked lakes.

With the expected increase in recreational boating, there was some concern expressed about marine toilets becoming a pollution problem in the future. Most thoughts expressed in this area were that if the problem does arise, it could best be handled by installation of various treatment devices on marine toilets, including chlorination, incineration, and holding tank systems. Where there are regulations, the trend is noticeably away from toilet sealing restrictions and toward treatment systems. The sealing restrictions, operating against nature, decidedly discourage recreational boating and also create administrative headaches.

Virtually all who made suggestions of any nature, stressed the idea of uniformity among the states in implementing regulations to control this matter. Without uniformity, it was felt that new regulations would be unreasonably burdensome on interstate boaters as well as difficult to enforce.

APPENDIX C

A MODEL ACT TO PROHIBIT LITTERING AND THE DISPOSAL OF UNTREATED SEWAGE FROM BOATS

A MODEL ACT TO PROHIBIT LITTERING AND THE DISPOSAL OF UNTREATED SEWAGE FROM BOATS

TITLE

An Act to regulate the disposal of sewage from watercraft and to prohibit littering of waterways

§ 1. DEFINITIONS

For purposes of this Act, unless the context clearly requires a different meaning:

(a) The term "watercraft" means any contrivance used or capable of being used for navigation upon water whether or not capable of self-propulsion, except passenger or cargo-carrying vessels subject to the Interstate Quarantine Regulations of the United States Public Health Service adopted pursuant to Title 42 United States Code § 241 and 243.

(b) The term "sewage" means all human body wastes.

(c) The term "litter" means any bottles, glass, crockery, cans, scrap metal, junk, paper, garbage, rubbish, or similar refuse discarded as no longer useful or useable.

(d) The term "marine toilet" means any toilet on or within any watercraft to discharge waste.

(e) The term "waters of this State" means all of the waterways on which watercraft shall be used or operated.

> Note: In some states it may be desired to limit the application of this Act to certain waters only and thereby exempt large bodies of water or water areas that are remote from population centers and on which there is no congestion and no conceivable boat pollution problem. The waters subject to pollution control under this Act could be enumerated or the state agency which is designated to administer the Act could be authorized to make a finding that a particular waterway should or should not be affected.

(f) The term "person" means an individual, partnership, firm, corporation, association, or other entity.

(g) The term "Department" means the (name of the State agency which shall administer this Act).

The choice of agency lies within the discretion of each state. It is recommended, however, that consideration be given to the state agency dealing with boating matters in general.

§ 2. LITTERING OR POLLUTING WATER - RESTRICTIONS

(a) No person shall place, throw, deposit, or discharge, or cause to be placed, thrown, deposited, or discharged into the waters of this State, any litter, sewage, or other liquid or solid materials which render the water unsightly, noxious or otherwise unwholesome so as to be detrimental to the public health or welfare or to the enjoyment of the water for recreational purposes.

(b) It shall be unlawful to discharge, dump, deposit or throw garbage into the waters of this State from a watercraft engaged in commerce.

This section is deemed sufficiently broad and flexible to prohibit any act committed on shore, in the water, or from aboard any description of watercraft, which litters or tends to pollute the water.

§ 3. MARINE TOILETS - RESTRICTIONS

(a) No marine toilet on any watercraft used or operated upon waters of this State shall be operated so as to discharge any untreated sewage into said waters directly or indirectly.

(b) No person owning or operating a watercraft with a marine toilet shall use, or permit the use of, such toilet on the waters of this State, unless the toilet is equipped with facilities that will adequately treat, hold, incinerate or otherwise handle sewage in a manner that is capable of preventing water pollution.

(c) No container of sewage shall be placed, left, discharged or caused to be placed, left or discharged in or near any waters of this State by any person at any time.

This section prohibits the discharge of any untreated sewage from marine toilets.

§ 4. MARINE TOILETS - POLLUTION CONTROL DEVICES

(a) After the effective date of this Act every marine toilet on watercraft used or operated upon the waters of this State shall be equipped with a suitable pollution control device in operating condition.

(b) Pollution control devices that are acceptable for purposes of this Act are:

1. Facilities that macerate or grind sewage solids and which, by chlorination or other means, disinfect the remnants before discharge into the water.

2. Holding tanks which retain toilet wastes for disposal at dockside or on-shore pumping facilities or in deep waters away from shore.

3. Incinerating type devices which reduce toilet wastes to ash.

4. Any other device that is tested by a recognized testing laboratory and determined to be effective in arresting the possibility of pollution from sewage passing into or through marine toilets.

This section recognizes that there are a variety of devices on the market designed to eliminate the possibility of water pollution from sewage passing into or through toilets aboard watercraft. Many of these devices have been tested by various state public health and water pollution control agencies and independent laboratories and found to be efficient for their purpose. However, with further improvements and innovations likely in this product area in the future, it is unwise to "freeze" specifications for such devices in statutory language. All technological changes can be readily incorporated into rules and regulations.

The desirability of nationwide uniformity in requirements for marine toilet pollution control devices cannot be emphasized too strongly. Boatmen will have to incur additional expense to install and maintain such devices. It would be a hardship and an inconvenience for boatmen traveling from state to state to be subjected to different jurisdictional standards of acceptability of these devices.

§ 5. MARINE TOILETS - CHEMICAL TREATMENT FACILITIES - STANDARDS

(a) Every chlorinator or chemical treatment facility shall be securely affixed to the interior discharge opening of a marine toilet, and all sewage passing into or through such toilet shall pass solely through such treatment facility.

(b) Sewage passing through a marine toilet equipped with a chlorinator or chemical treatment facility shall be deemed untreated unless the effluent meets the following minimum standards:

1. Sufficiently divided into fine particles so as to be free of unsightly solids.

2. Containing 1,000 or less coliform per 100 ml.

This standard meets the requirements of the U. S. Public Health Service and is acceptable by most state public health agencies for swimming and bathing purposes.

(c) The chlorinator or chemical treatment facility shall be of a type which functions automatically with the operation of the marine toilet, does not depend on septic action as part of its treatment, is easy to clean and maintain, and does not permit the escape of dangerous gases or obnoxious odors.

(d) The disinfecting agent used in the facility shall be of a kind that does not necessitate too frequent replenishment, is easily obtainable, and when discharged as a part of the effluent is not toxic to humans, fish or wildlife.

The foregoing standards are generally acceptable under existing state marine chlorinator laws. In the interest of uniformity they are recommended to other states proposing the adoption of such laws.

§ 6. MARINE TOILETS - STANDARDS FOR MANUFACTURERS OF POLLUTION CONTROL DEVICES

Every manufacturer of a marine toilet pollution control device described in this Act shall certify to the Department in writing that his product meets the standards set forth in this Act or in any implementing regulations adopted by the Department. Every such certified statement shall be accompanied by a test report showing that the product meets the prescribed standards. It shall be unlawful to sell or to offer for sale in this State any marine toilet pollution control device that has not been so certified and approved by the Department.

§ 7. CERTIFICATE OF NUMBER

The Department may require persons making application for a certificate of number for a watercraft pursuant to (statutory citation of State Boat Numbering Act to be entered here) to disclose whether such watercraft has within or on it a marine toilet, and if so, to certify that such toilet is equipped with a suitable pollution control device as required by this Act. The Department is further empowered to direct that the issuance of a certificate of number or a renewal thereof be withheld if such device has not been installed as required by this Act.

§ 8. ON-SHORE TRASH RECEPTACLES

The owner or whoever is lawfully vested with the possession, management and control of a marina or other waterside facility used by watercraft for launching, docking, mooring and related purposes shall be required to have trash receptacles or similar devices designed for the depositing of trash and refuse at locations where they can be conveniently used by watercraft occupants.

§ 9. EDUCATION

The Department is hereby authorized to undertake and to enlist the support and cooperation of all agencies, political subdivisions, and organizations in the conduct of a public educational program designed to inform the public of the undesirability of depositing trash, litter, and other materials in the waters of this State and of the penalties provided by this Act for such action, and use funds provided by the Legislature for this purpose. The Department is further authorized to utilize all means of communication in the conduct of this program.

§ 10. ENFORCEMENT

All watercraft located upon waters of this State shall be subject to inspection by the Department or any lawfully designated agent or inspector thereof for the purpose of determining whether such watercraft is equipped in compliance herewith. The Department is further authorized to inspect marinas or other waterside public facilities used by watercraft for launching, docking or mooring purposes to determine whether they are equipped with trash receptacles and/or sewage disposal equipment.

§ 11. LOCAL REGULATIONS PROHIBITED

Through the passage of this Act, the State fully reserves to itself the exclusive right to establish requirements with reference to the disposal of sewage from watercraft. In order to ensure state-wide uniformity, the regulation by any political subdivision of the State of sewage disposal from watercraft is prohibited.

§ 12. RULES AND REGULATIONS

The Director of the Department is hereby authorized and empowered to make, adopt, promulgate, amend and repeal all rules and regulations necessary, or convenient for the carrying out of duties and obligations and powers conferred on the Department by this Act.

§ 13. FILING OF REGULATIONS

A copy of the regulations adopted pursuant to this Act and any of the amendments thereto, shall be filed in the office of the Department and in the office of the (official State record keeping agency). Rules and regulations shall be published by the Department in a convenient form.

§ 14. PENALTIES

(a) Every manufacturer of a marine toilet pollution control device who violates Section 6 of this Act or any regulations adopted by the Department pursuant thereto shall be deemed guilty of a misdemeanor and upon conviction shall be punished with a fine of not more than $______.

(b) Any person who violates any other provision of this Act or regulations of the Department adopted pursuant thereto shall be deemed guilty of a misdemeanor and upon conviction shall be punished with a fine of not more than $______, or by imprisonment of not more than ______ days, or by both such fine and imprisonment at the discretion of the court.

§ 15. SAVINGS CLAUSE

If any court shall find any section or sections of this Act to be unconstitutional or otherwise invalid, such findings shall not affect the validity of any sections of this Act which can be given effect.

§ 16. EFFECTIVE DATE

The provisions of this Act with reference to requiring watercraft with toilet facilities to be equipped with pollution control devices shall take effect three years from the date of the adoption of this Act. The provisions of this Act prohibiting littering the waterways shall take effect immediately.

> It is suggested that the effective date of this Act be delayed so that all persons affected by its provisions will have a reasonable amount of time to become acquainted with it and secure the required treatment devices.

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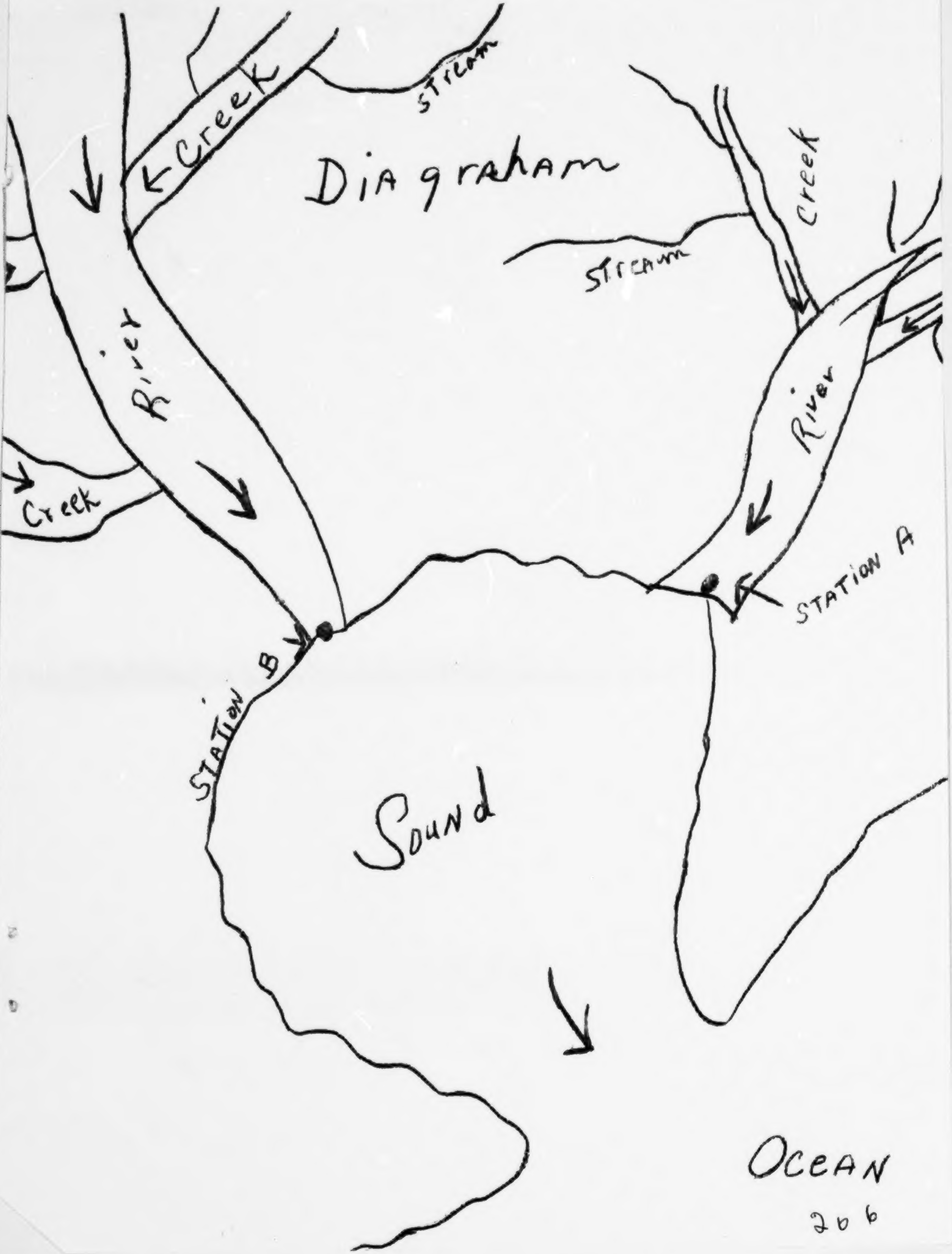
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Station A
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